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EDITED BY

WM. DENISON ROEBUCK, F.L.S.,

F.R.P.S.E.,

RECORDER TO AND EX-PRESIDENT OF THE CONCHOLOGICAL SOCIETY; HON. SECRETARY OF THE YORKSHIRE NATURALISTS' UNION; JOINT-AUTHOR OF A 'HANDBOOK OF THE VERTEBRATE FAUNA OF YORKSHIRE'; HON. MEMBER OF THE BRADFORD NATURALISTS' AND MICROSCOPICAL SOCIETY, CLEVELAND NATURALISTS' FIELD CLUB, MALTON NATURALISTS' SOCIETY, LIVERPOOL NATURALISTS' FIELD CLUB; ETC., ETC.;

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

J. GILBERT BAKER, F.R.S., F.L.S.,
W. EAGLE CLARKE, F.L.S., M.B.O.U.,
ALFRED HARKER, M.A., F.G.S.,
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GEORGE T. PORRITT, F.L.S., F.E.S.,
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PREFACE.

THE Editors cannot allow the present occasion to pass without direct reference to the irreparable and exceptionally serious loss which this journal sustains by the death of Mr. John Cordeaux, whose valuable papers and notes continued to appear down to the date of his decease. His own complete bibliography of his own papers is in hand, and when revised will be printed in this journal.

They have to thank their contributors for the articles and notes they have contributed during the year, and their subscribers for much-appreciated support. A considerable increase in the latter respect is, however, urgently needed, to allow of the enlargement of the journal, in order to cope with the large amount of high-class matter available for publication.

THE NATURALIST

FOR 1899.

OCCURRENCE OF RARE PLANTS IN CUMBERLAND.

WILLIAM HODGSON, A.L.S.,

Workington, Cumberland.

Valeriana pyrenaica L. **Heart-leaved Valerian.** During a week's sojourn at Netherby, on the extreme north of this county, during the earlier days of July 1897, I made my first acquaintance with this exceptionally rare plant, usually classed as an alien, or occasionally naturalised in plantations. By the courteous permission of Sir Richard J. Graham, Bart., of Netherby Hall, I had gone to Longtown, and from thence to Netherby, with the view of acquainting myself more thoroughly with the botany of the neighbouring district, for the purpose of a Flora of my native county, which I have long been preparing for publication, and which is now in the hands of the printers. I was recommended to visit the famous Solway Moss, and on my way thither to explore a wood adjoining the highway between Longtown and the Moss, where I was informed that I should find a coarse-looking plant which had greatly puzzled the natives to identify. On reaching the wood I found immediately within the gate large patches of the plant, which, with a few exceptions, had done flowering for the season. Farther in the wood were to be seen more and more of the plants, numbering well over a hundred specimens in all. Many of these exceeded three feet in height, and they seemed so vigorous and healthy that I concluded the locality was congenial to their growth and development. On reaching home with such specimens as I had secured I had no difficulty in their classification. The flowers bore a strong resemblance to those of *V. officinalis*, and the large broadly heart-shaped, almost circular root-leaves tended further to the identification of the species. The wood bears, I believe, the name of Silver Hill Plantation, and it stands upon a part of what was formerly known as the Debatable Ground, claimed alike by England and Scotland.

Rumex maritimus L. **Golden Dock.** During the same month of July 1897, while visiting the ballast heaps at Maryport, I found about a dozen examples of this dock, a species new to me, growing in a moist hollow, associated with about an equal number of plants of *Chenopodium polyspermum* and *Ch. opulifolium*, and a single specimen of *Bromus schraderi*, a South American brome grass, probably the offspring of a number of that species discovered close to the same place in 1890-91. The dock has not made its appearance this year, and only a few plants of the fig-leaved goosefoot of exceptional size now mark the spot.

Trientalis europæa L. **European Chickweed Winter Green.** Not many days ago I was informed by Mr. Harold Adair, of Foxhouses, Whitehaven, that the Chickweed Winter Green had been discovered in Upper Eskdale, in the south-west of the county, by Miss Edith Pearson, of Wigton, while staying in that valley during the month of June in the present year. She did not know the plant, but my correspondent, who also was staying in Eskdale at the same time, and knew the plant well, explained to her—what the lady herself had no conception of—that the chickweed-looking specimen was of uncommon rarity in these parts, and indeed was not very plentiful where found.

Vicia orobus D.C. **Wood Bitter Vetch.** Mr. Harold Adair also informed me at the same time that he had found the Wood Bitter Vetch high up in the same valley beyond the highest railway station, 'The Boot,' where it is quite plentiful about the edges of meadows. Up to the date of my friend's discovery all the records respecting this plant were confined to the district of Cumberland lying between the river Eden and the Pennine Hills, or as Bishop Nicolson puts it in his MS., 'Great Salkeld copiosé, sed præsertim apud Blencarn—nostratibus Horse pease.' I recollect Mr. P. H. Grimshaw having some good finds in the same valley a few years ago.

Chrysanthemum coronaria. Alien. Found growing on some poultry runs on the south side of Silloth Dock, in August of the present year, 1898. I had noted it on some household refuse at Risehow, Maryport, in 1886.

Xanthium spinosum L. Alien. A few stray specimens of the above species have appeared during twelve successive seasons, including the past year, on the south side of the dock at Silloth. They have in no instance been known to ripen seed there, and yet there is no palpable diminution in number. The

specimens have even been more numerous this year than usual, and certainly finer.

Since writing the above, dried specimens, with perfectly-developed flowers, have been received from Miss E. J. Glaister, of Skinburness House, Silloth, whom I had requested to look out for their probable flowering this year. The accompanying card is dated 3rd October 1898.

Amaranthus retroflexus and ***A. albus.*** These two kindred aliens were both noted at Silloth in August last. The former has appeared at intervals for many years past at Risehow, Maryport, Flimby, and at the Derwent Tin Plate Works, Workington, usually associated with *Cannabis sativa, Phalaris canariensis*, etc., where the sweepings of bird cages have been deposited. The latter has more rarely been observed at the mound, near Derwent Tin Plate Works, where it was rather plentiful ten years ago, but has disappeared gradually since the works were suspended, and is not now to be met with there, no fresh material being available. It was first seen at Silloth this season.

Ambrosia maritima and ***A. trifida,*** two other closely allied species of aliens, were also among the plants gathered at Silloth on the same occasion. Like the preceding pair, the former of them has been located for some years past near the extreme point of land jutting into the sea, on the south side of the harbour entrance, where it appears likely to become permanent. The latter—seen by me for the first time—was pointed out to me at the extreme landward end of the dock by Mr. John Glaister, of the Grune House, Skinburness. We subsequently found specimens scattered along the south side of the dock at intervals. It is a coarse species; the flower spikes closely resemble those of *A. maritima*, but leaves and stem are alike covered with stiff hairs, the whole being quite rough to handle.

NOTE—ORNITHOLOGY.

Spotted Crake and Albino Sand Martin near Harrogate.—I have been fortunate in procuring for the Yorkshire Philosophical Society a beautiful albino example of the Sand Martin (*Cotile riparia*), apparently a bird of the year, which was taken from a hole at Killinghall, near Harrogate, during the past summer. Albino specimens of the House Martin (*Chelidon urbica*), are not specially uncommon, but this is the first White Sand Martin which has come under my notice.

About the same time a Spotted Crake (*Porzana porzana*) was shot somewhat nearer to Harrogate, where it is probable that they are not so rare as is generally supposed.—J. BACKHOUSE, Daleside, Harrogate, 2nd November 1898.

NOTE—COLEOPTERA.

***Monochammus sartor* at Grimsby Docks.**—In July my brother brought me a fine specimen of *Monochammus sartor,* taken by him on the Royal Dock-side, Grimsby. It was submitted to Rev. A. Thornley for identification by Mr. A. Smith, who informs me it is the third specimen recorded for Lincolnshire.—J. CURTIS, Garibaldi St., Grimsby, 10th Dec. 1898.

NOTES—FLOWERING PLANTS.

***Lobelia* and *Vaccinium* in the Lake Country.**—I add a few notes to those by Mr. Lister Petty in the December 'Naturalist.'

Vaccinium Oxycoccos L. Cranberry, Crones, or Cranes. Well might Mr. Petty traverse the statement that the Cranberry is a rarity in the Lake Country, seeing that my notes for the Cumberland part of Lakeland alone contain the following entries, with the authorities annexed, viz., Ennerdale, Black Moss, Egremont, etc. (Rev. F. Addison, Mr. Jos. Adair); Floutern Tarn (W. Foggitt); swamps at the highest point of the pass over Whinlatter (H. C. Watson); Mockerkin, near the Tarn (W. B. Waterfall); south side of Skiddaw, near the foot of the hill (N. J. Winch); Mosedale in Wastdale (Rev. A. Ley); by the river Caldew, near the foot of Wiley Ghyll, in spongy bogs; Mosedale Moss, under Carrock Fell (W. Hodgson); Eskdale Green, Muncaster (P. H. Grimshaw). In Ennerdale there seems to be two varieties, one producing red berries, the other a greyish purple fruit (Jos. Adair). Boggy place just off the road separating Latrigg from Skiddaw (Rev. Hilderic Friend).

Also in the lower valleys of Cumberland Crones are far from being scarce. Hutchinson's History of Cumberland, published in 1794, informs us that fruit to the value of £20 annually was gathered about Tarn Wadling, near Hesket, in the ancient Forest of Inglewood. This tarn was drained about fifty years ago by the proprietor, Lord Lonsdale, and the bulk of the plants have probably disappeared. The Cranberry is found at other stations within the limits of the Forest, and is reported from Udford Bog, Edenhall, by Mr. Varty-Smith, from Ainstable Moor by the Rev. H. Friend, and from Wragmire Moss by Mr. W. Duckworth, formerly of Carlisle. Towards the Solway I have noted it from Salta Moss, near Dubmill, Hangingshaw Moss, New Cooper, and from the Moss at Bowness-on-Solway, at which latter station Mr. Friend has also remarked it; Bromfield, near Allonby, 1800 (Rev. J. Dodd); Todhills, near Carlisle, to the northward; and finally I saw it in abundance flowering as late as 6th July 1897, on Solway Moss, at the extreme verge of the county, adjoining Dumfriesshire.

Lobelia Dortmanna. With reference to the Blea Tarn mentioned in Mr. Baker's Flora of the Lake District, pp. 142-3, I believe I am correct in referring it to the tarn of that name, which lies in a secluded hollow under High Street, in Westmorland. The plant grows abundantly in our Cumberland lakes and tarns, at a few feet from the edge, according to the depth of the water. I have seen it thus in Ullswater, Derwentwater, Thirlmere, Ennerdale Lake, Buttermere, Loweswater, Overwater, Floutern Tarn, Bassenthwaite, Watendlath Tarn, etc. It grows in wonderful profusion in some peaty pools, hardly attaining the dimensions of a tarn, near Gillerthwaite, in Ennerdale, some distance from the head of the lake. Here, in the flowering season, about midsummer or a little later, the surface of the pools is quite hidden by the azure tints of the flowers. The *Lobelia* is here associated with *Menyanthes trifoliata*, also in abundance and of exceptional growth. Bishop, or as he was then Archdeacon, Nicolson reports it as under 'Gladiolus palustris, seu lacustris, flore subcœruleo, Water gladiole, or flowering rush. Hulswater (T. Lawson). In Tarn Wadling, near Hesket. Tarn near Cockermouth, flowers in the water.' Probably Mockerkin Tarn is intended by the latter. I have already explained that Tarn Wadling now exists only in name. Dr. Nicolson's list, from which I have just quoted, bears date 1690.—WILLIAM HODGSON, Workington, 6th Dec. 1898.

TREES AND TREE-NESTERS.

Miss MARY L. ARMITT.

THERE is a certain strip of woodland left to the Lake country, very hoar and ancient, and which is, in position and character, not a little singular. It lies about an old highway, which skirts a great scar-side at a point that may be termed the ankle-joint of the mountain, because there the steep foot-meadows spread more gently to the lake margin from the steeper fell and scree above. A high-road truly this way no longer is, but only a broad track, levelled and buttressed, showing how man in early days kept his line of route high and dry, and being sound of breath and limb, and well-nigh independent of wheels, shunned the bottom flats and the swamps that filled them.

But now that he so much less propels himself by lung and foot, but bowls upon wheels of many kinds along the great high road—smooth as a ship's deck—that traverses the well-drained valley, this ancient route is lonesome. The grass is scarce worn in its centre; the deep stone tanks that stud it—ancient wells that tapped the rills coursing so strangely under-ground (and faintly audible at places) for the refreshment of man and beast—are choked or empty. No one now pauses to drink at them, and therefore no one tends them. Very wild and lonesome is the place. The great crag, on which Kestrels breed, raises a sheer head aloft, while between it and the road, on the huge boulders and shelving screes that fringe the scar, there is a wild growth of forest and fern. There, amongst rocks and piled stones, are wondrous nooks; mossy chambers, screened within the debris; tiny springs, breaking forth and enriching all things round; seemingly inaccessible steepnesses clothed with green; and great old trees spreading gnarled roots among the rocks.

Up and down, too, about the road, fringing it as solitary specimens, or, on gentler grassy slopes below, grouped as patches of unwalled woodland, are ancient trees. Like the road, they are reminiscent of man. At first glance they seem but remnants of that pristine forest that probably once clothed the whole of our mountain area—specimens which have survived untouched upon unneeded rocky ground. But presently may be discerned about them signs of ancient handling and of ancient guardage, possibly by some common forest-rights; and protection is happily now extended by a private owner, so that

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these aged monarchs may live out the small remnant of their lives in peace. They are Oak trees mostly, interspersed by a few Ash and Cherry trees; and shrubs of Hazel, Holly, Thorn, and Rowan crowd among them; while the Yew trees that here and there cling to the naked scar are far above the general line of woodland. Some of the trees have reached, by an undeterred growth, the height and expanse possible in these shallow soils, stretching wide arms from a stout main trunk. But many again, more especially upon certain patches, show—full-grown and majestic as they are—by their disposal of limb to trunk, traces of man's axe, wielded long ago.

In the days of their youth, long, long ago, when wood was the only fuel obtainable except peat, and man's dwellings were roofed with timber grown at hand, these trees would seem to have been lopped, or pollarded, at a distance of from 8 to 14 ft. above the ground. The tree, then, having lost its main stem, threw its arrested growth into several great converging limbs. In some few instances, these limbs were again lopped at a point considerably higher, and clearly at a date long subsequent, so that from the short, thick trunk there now branch, first, four or five vast, rugged elbows, and from these again spring, rocket-like, a shower of slender stems.[1]

Very weird and fantastic in shape are the trees of this woodland, even down to the Hollies and the Thorns. So twisted and writhing in form are they, so knotted and gnarled at the joints, that they recall the pencil of Gustave Doré, who drew no stranger forms than theirs; for the older they grow the weirder do they become. As decrepitude sets in, the massive elbows, weakened and riven at the joint by rain and humus, and growing things that collect therein, snap off, sometimes splitting the whole trunk downwards with their fall. Finally, the central trunk alone is left, a weird and crumbling tower of timber, to rot slowly piecemeal. Ivy wraps it round perhaps in a dozen-armed embrace; or a Rowan may run its slender stem up alongside, and like a pennon flaunt above the ruin a fictitious crown of green.

All sorts of things live and grow upon these aging Oaks. Besides lichen on the slender twigs above, and moss of several

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[1] It is possible that some few of these trees may have been maimed by Nature. Several fine young Oak trees hereabouts lost their main stems by the snowfall of 24th-25th October 1896, which snapped right off under the superincumbent weight collected by the leaves. An early snow, before foliage has fallen, does much damage to trees.

kinds upon the bark of stalwart branch and trunk, where rain and mist will filter down, and fungoid growths of many a kind, there is Polypody fern growing in every hollow, gash, or rent; the Broad Boss fern springing here and there in crevices, as well as Wood-Sorrel and many another little flowering weed; and seedling trees, Mountain Ash, Holly, Hazel, or Silver Birch, sprouting from the cracks. These little seedling trees may be detected by their stripling-like straightness, where they shoot aloft from the aged boughs, two and three—nay, even six, I am told by the woodman—upon one tree, up and up to the top. Nor are the lodger-trees all striplings. Looking through the woodland in the last week of April, while the Oak trees are bare of leaf and show their centres, we pass tree after tree, bearing aloft a lodger, stalwart and strong, dark with its cloud of Holly leaves, or bright with the new verdure of the Mountain Ash. In the hollow of the crown of the Oak, some 10 to 15 ft. above the ground—for there only, where moisture lingers, and a little soil doubtless is formed from blown dust and leaves and fern-root, can real growth be obtained—does the lodger sit, stout and strong, reaching up boughs sometimes to a height little short of those of its host-tree. Sometimes there are twin-lodgers in a tree.

One Sycamore tree, sound and in its prime, holds both a Hazel Bush and a Rowan; an Oak carries two stout Hollies; another Oak two stout Hollies and a Rowan. In this last instance the size of the lodgers is so surprising that I got the woodman to measure them.

	Girth of main stem where it springs from the lap of the oak.	Height.
1st Holly ...	10 inches ...	8 feet.
2nd Holly ...	26 ,, ...	25 ,,
Rowan ...	27 ,, ...	28 ,,

Another instance—the one that first drew my attention to these double growths—is even more surprising. When first seen, the lodger Rowan had already grown so large, many-branched and top-heavy, that it had split down the oak on one side, and had toppled over. But still it clung to its foothold on the knees of the giant—for there, indeed, it was securely rooted, and thence it derived nourishment. It lay across, its upper branches leaning against the steeply-sloping ground, and was neither vanquished nor dead; it was then (26th April 1896) not only green with leaves, but was preparing a lusty show of flowers. The Oak, smashed though its branches all were, and its trunk rent on the side of the fall, lived, too, on the other side, and

bravely spread its summer greenery; and the two together, inextricably intertwined, made such a confusion of down-leaning and up-stretching limbs and boughs and foliage as surely was never seen before. The Rowan was later cut out, and now lies, dislimbed, a monument of perverted growth. Its main stem, at the point a little above where it first cast off its seed-shell, and caught hold of the Oak with its little, grasping foot, measures over 1½ yards round. Immediately above, it branches into five large, and almost equal arms; the one arm left measures 24 inches round. Immediately below, the main stem passes into what must have been a huge buried stem, or root,

Old Oak, rent down the trunk by the fall of an arm. The Oak, behind and below, contains the two Hollies and the Rowan described.—From a photograph by Mr. J. R. White.

of girth little less than the above-ground stem. With this one root it seems to have struck down and pierced the heart of the Oak, reaching down and down, until it not only (in probability) reached the ground, but, swelling ever greater, occupied a great part of the Oak trunk, and finally caused its fracture. In this fact, the secret of these surprising growths is no doubt disclosed, for it is not possible that, seated upon the laps of the giants, they should attain the size they do, dependent only on the moisture of the air (damp though our woods are) and on the fraction of soil in which they first germinate. Their roots

frequently, no doubt, go down through the Oak to the soil. In the instance quoted above, where two Hollies and a Rowan live on an Oak, the roots of the Rowan may be detected as certain rod-like excrescences, bursting through the bark of the Oak near the ground.[1]

These lodger trees are no doubt mainly planted by birds. Their species almost attest the fact. The berry of the Mountain Ash is the favourite food of many birds; and Thrushes—Song and Missel—Blackbird, Bullfinch, and Chaffinch clear the autumn crop with avidity. The Finches that, clinging to the tree, pick the berry and eat its seed forthwith, can scarcely propagate the tree; but the habit of the Thrushes, to carry a whole berry off in the beak to eat at leisure, will cause many to be scattered.

The Holly berry makes the winter sustenance of many birds, of Ring Doves, Blackbirds, Thrushes, Fieldfares, and Jays. All these birds swallow the berry whole, and straight away; but perching as they do on the adjacent Oak tree after their feast, many of the rejected seeds must be dropped upon the boughs. It has lately been disputed, indeed, that a seed—such as the Mistletoe—can germinate after passing through the digestive organs of a bird, but this is beyond my knowledge. On entering this woodland, after surprising a party of Doves that feasted on the Hollies, I have found the ground of the wood below the bushes, and below the larger trees on which they have rested, literally strewn with bare seeds; and from the clean appearance of these seeds, and the masses in which they lay, I conjectured that they may have been thrown up by the bird, after it has secured the red covering of the seeds, which it relishes. If such were the case, the germinating power of the seed would not be injured.

The Hazel nut is eaten through to its centre by Great Titmouse and Squirrel; but the little quadruped, if it stores the nut, must sometimes forget where it has laid its treasure; and the bird, carrying off the nut as it does, to break on some adjacent hard and forked bough, may deposit it in a crack. The Silver Birch, of which I have seen only one as a lodger, is manifestly wind-sown.

The trees of this woodland are naturally haunted by birds. Not only do they furnish birds with shelter and with food, but with nesting-holes as well. No nesting place is more secure, warm, or comfortable than an old, decaying tree. And so this

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[1] This Rowan bore a crop of berries this summer (1898), when the glimmer of their coral red up amongst the Oak leaves made a singular sight.

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belt of woodland has almost an avian character of its own, owing to the opportunities it offers to hole-breeding birds. Not only do the birds that invariably breed in trees here flourish—the Brown Owl, the Tree-Creeper, the Marsh Titmouse, the Pied Flycatcher—but birds that elsewhere in Lakeland nest generally in walls, such as the Jackdaw, Starling, Great Titmouse, Blue Titmouse, and even the Redstart, here revert to a possibly pristine habit of tree-nesting.

In an eight years' experience in another part of Lakeland, I never happened to know of a Blue Titmouse's nest in other than a building-hole ; while the first spring's acquaintance with

The nesting Oak, for two years, of the Pied Flycatcher. The hole is in the boss on the left, overshadowed by ivy.—From a photograph by Mr. J. R. White.

this woodland stretch showed, unsought, three nests in holes of trees. The Great Titmouse, whose secrets are rarely told, was seen to feed its brood in an ancient Holly tree. Even the Redstart afforded the long-sought instance of tree-nesting. Out of eleven nests known that season in the immediate neighbourhood, nine were in wall-holes as usual, one in a natural pile of stones, and the remaining one was placed in the crevice of a pollarded Ash, where Polypody-Fern made green shade about the boss.

As for the Pied Flycatcher, it may be said, upon a very limited area, to abound ; and though this area spreads beyond

the woodland stretch above described, the stretch undoubtedly makes its centre; so that the birds' numerousness may be ascribed to these ancient trees, in which it habitually breeds. It loves those little pocket-like holes that are found in the trunk of even sound trees—Sycamore, Wych-elm, but generally of Oak—that are caused probably by the early loss of a branch; or the larger space of a hollow bough; or those strange, wart-like excrescences, when hollow, that are sometimes seen in old trees. These the hen lines with moss, bents, and rotten wood, making a deep cushion of such stuff as comes handiest. The same hole is frequently used two years at least.

But numerous as are the nesting-holes to be found in these trees, they are not numerous enough for the Pied Flycatcher. When the birds have arrived in full force—the old males in the last week of April, the young ones along with the hens in the first or second weeks of May—there is keen competition for the holes left vacant by other birds. The winter residents have naturally been first on the ground, and suited themselves; and, indeed, some of them—the Starling and the Great and Blue Titmice—seem often to take holes that have been already used by the Pied Flycatcher, with all the nest-stuff therein. The Starling, in fact, I have known to oust the little bird after it was established. It is capable, however, of reprisals. In the orchard of Fox How, as the owner narrated in the 'Spectator' some years ago, the Pied Flycatcher not only turned a pair of Blue Tits from their nest-hole, but calmly built its own nest on the top of their eggs. I have been told of several cases of double nests in neighbouring trees.

Thus it is that, abundant as the Pied Flycatcher is, not all the birds that come remain to nest. In affluent years, the males in May are planted thickly, and sing vociferously; then many, either for want of nest-hole or mate, drift away.

The birds come and go, as the summers come and go, leaving the old woodland much the same. When it is most beautiful, with its sweeps of sloping grass, and its mounds of castle-like rocks, who shall say?

In spring, when the fresh green begins to break forth, and the Cherry trees are white with blossom, and Oaks first put on the golden-green of flowers and leaves; and birds from far southern lands sport, and mate, and sing, and nest in their branches; and the lake gleams below the trees, and through them, not shut out yet by the expanded leaves; and the Kestrels cry in the crag above.

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Or, in summer, when the Oaks have settled to their heaviest green; and the Green Moths, emerging suddenly in the heat from their chrysalids within the folded leaves, hover for the marriage dance by thousands—a light and moving cloud—about the boughs; and families of birds patrol the wood in gay, glad company—all but the Wood Warbler, that still has a yellow-breasted nestful waiting for supplies on the floor of the wood; and about the dry, hot grass the dusky brown butterflies flit; and the Chaffinch keeps as low, seeking for food where the white clover holds within the withering flower a delicious green seed-pod, with tiniest of peas therein.

Or, in autumn, when St. Luke's summer adds day to day of pure, still sunshine; and the Hollies already have brightened their berries to scarlet; and the Oak trees bear yet their summer leaves, turned to palest yellow and brown, wanting but a faint breeze to bring them down in a sudden shower; and the changeless dark-leaved Ivy, bushing out in the midst of the trees, will not wait for their fall, but opens its myriad blossoms to the sun; and the myriad insects that seek them from far, can be told by the full-toned hum heard underneath; and the Robin, perched near on a bough, makes low, inward melody of utter content.

Or, in winter, when the great trees are bare and naked, and the light is low; and the Owl snoozes at noon in the ivied Oak, and the Buzzard cries loud from the mist; and Holly and Ivy together—though one flowered in May and the other in early November—offer their fruit to the birds; and the Holm-Thrush rattles the smooth, dark leaves as it picks; and the Ring Dove crosses to where a crowd of its fellows, with loud-fluttering wings, snatch red berries from the prickly-leaved bush; and the Gall Fly hops on the sodden ground; and the Field-mouse, living hard by in the wall—the daintiest feeder of all—leaves at its doorway its refuse of berries, the red husks that birds love, and the seed-cases as well, for out of them it clears, with the neatest of teeth, the kernel within.

When? for always the woodland is full of life, of wonder, and of beauty.

NOTES AND NEWS.

We have before us the Report of the Manchester Museum for the year 1897-8, and are pleased to see that the vigour, energy and success with which it has of late been carried on, show no signs of abatement. It is gratifying to learn that by the use of electric lighting it is expected that the museum may be opened on weekday evenings, and thereby its usefulness considerably enhanced

THE YORKSHIRE BOULDER COMMITTEE AND ITS TWELFTH YEAR'S WORK, 1897-8.

PERCY F. KENDALL, F.G.S., *Chairman*,
AND
J. H. HOWARTH, F.G.S., *Hon. Secretary*.

UNREMITTING attention has been devoted to the subject of boulders during the year, resulting in returns which are described in the report of the Boulder Committee of the British Association as 'a valuable and significant set of records.'

The discovery of two large glaciated boulders of chalk near Scarborough is of interest, as that point is fully 20 miles to the northward of the chalk cliffs of the Yorkshire coast.

Attention was directed last year to the remarkable fact that the *Belemnitellæ* collected from the drift of Holderness belonged without exception to the species *B. lanceolata*, unknown as a constituent of the fauna of the Yorkshire chalk, which contains instead *B. quadrata*. This conclusion is fully sustained by the work of the past year, and emphasises the well-known fact that *black* flints, which are unknown in the local chalk, are found plentifully in the glacial deposits of the Yorkshire coast. One such flint, containing a cast of *Echinocorys*, is reported from the inland station Market Weighton.

Further valuable work has been done upon the distribution of Shap granite, and its sporadic grouping receives a fresh illustration from the Yorkshire coast.

Further light is thrown upon the source of the in many ways anomalous patch of boulder clay at Balby by the discovery in it of three specimens of Eskdale granite.

Our knowledge of the distribution of erratics of Scandinavian origin receives a welcome addition by the observation of a second example of the granite from either Angermanland or Åland (Sweden) at Easington, and by the recognition of a pebble of rhomb-porphyry at Brough. The latter is the first undoubted occurrence of a Scandinavian boulder within the line of the Chalk Wolds.

The Committee is also enabled to announce the recognition amongst the far-carried erratics of the east coast of England of a considerable number of Norwegian rocks from localities which were not previously known to have yielded boulders to the English drift.

January 1899.

The Chairman (Mr. Kendall) spent a month during the summer of 1897 in Norway between Christiania and Christiansand collecting rocks for comparison with the erratics of the east coast of England. He brought away a large quantity of material illustrating important petrological types, and has now distributed about 300 specimens amongst English workers in glacial geology, to whom they may be useful. Other sets will be lodged in public museums.

A series of east coast erratic boulders collected by Mr. J. W. Stather, F.G.S., and Mr. Thomas Sheppard was taken to Christiania and submitted to Professor Brögger, who had kindly consented to examine them. Professor Brögger's examination was not carried to completion, as the thin sections which should have accompanied the specimens had gone astray in the post, but some rocks were nevertheless singled out by him which possessed such marked characteristics as to admit of positive identification.

These determinations are of so much interest and importance that it has been thought desirable to publish them in this report rather than to wait for a more complete statement.

The well-known rhomb-porphyries yielded examples from the Ringerike, Tonsberg, and Tuft (in the Langendal) districts.

Laurvikite (augite-syenite) of the type which prevails over such large areas southward of the latitude of Christiania was recognised. These are rocks with which English geologists have for some time been familiar, but besides these Professor Brögger found the pyroxenite of Fettvedt, Christianiafjord; a soda syenite from the country north of Christiania; a basic rock from Hitterdal (this is a very pronounced type regarding which Professor Brögger spoke with great confidence); the Labradorite-porphyrite of Mos (on the east side of the Skagerrack south of Drobak), and rocks from the neighbourhood of Drammen.

In addition to these there are examples of Labradorite-porphyrite with porphyritic conspicuously-zoned felspars, which is known as an erratic in Norway, but has not been traced *in situ*.

Finally Professor Brögger recognised three examples of the sandstone or grit representing the curious 'Sparagmit-conglomerat,' which covers a vast area in the high mountainous interior of Scandinavia northward of Christiania. The specimens in question may have come from Gudbransdal, about the northern part of Lake Mjösen.

A coarse granite collected by Mr. Sheppard, Professor Brögger considered to resemble the rocks of Ragunda in Angermanland, a conclusion confirmatory of Dr. Munthe's recognition of a boulder composed of a similar rock (see 1896-7 report, p. 3), and which occurs also according to Mr. Crofts at Easington.

Reported by Mr. W. Gregson, F.G.S.

Mount Grace Priory, seven miles N.E. of Northallerton.

1. Shap granite. 24 × 12 × 10 inches. Sub-angular; no striæ.

Reported by Mr. H. Speight.

Morecambe. On shore near Battery Inn, West End.

1. Shap granite.

Reported by Mr. J. Burton.

Balby, near Doncaster.

Eskdale granite (three pebbles).

Reported by Mr. P. F. Kendall, F.G.S.

Market Weighton.

Nodule of black flint, with *Echinocorys vulgaris*, in gravel pit one mile from town on the road to Holme.

East Riding Boulder Committee.

Reported by Mr. W. H. Crofts, Hull.

Easington.

A specimen of Post-Archæan granite from Ångermanland or Åland. First specimen recognised by Dr. Munthe (see last year's report).

Reported by Mr J. F. Robinson, Hull.

Wassand, near Hull. Behind Wassand Hall.

1. Coarse basalt. 4 × 3 × 2½ feet. Sub-angular.

Reported by Mr. Harold Sales, Hull.

Willerby, near Hornsea.

At the east end of the Hull and Barnsley Railway cutting, west of this village, there is boulder clay 14 or 15 feet in depth resting on chalk for some distance, 150 feet above sea level. The clay, which contains much chalk in small pieces, is blue jointed and of the red Hessle type, but distinctly greyer downwards.

The following 38 boulders were noted, all of which were 6 inches and upwards in diameter.

6 Carboniferous limestones, striated.

15 Whinstone, deeply weathered.

6 Sandstone, probably carboniferous.
3 Secondary rocks.
8 Granite, gneiss, etc.

Also a small boulder of rhomb-porphyry 2 × 2 × 1 inches. Several specimens of *Belemnitella lanceolata* (Schloth), a form foreign to the Yorkshire chalk; many black flints not Yorkshire; lower lias fossils, etc.

Reported by Mr. THOMAS SHEPPARD, Hull.

ATWICK.

Red gneiss. 16 × 32 × 30 inches. Sub-angular.
Hornblende gneiss. 40 × 37 × 27 inches. Rounded.
Shap granite. 38 × 32 × 28 inches.

NOTE.—All these at the foot of the cliffs. The particulars of the last one, together with a specimen, were sent to me by Mr. William Morfitt, of Atwick.

BROUGH.

Rhomb-porphyry, rounded, 5 inches in diameter; much weathered. In gravel in Mill Hill pit, 100 feet above O.D.

NOTE.—This is the most westerly point at which this rock has been recorded.

DIMLINGTON (with Messrs. J. W. Stather and W. H. Crofts).

Augite-syenite. 18 × 15 × 15 inches. Rounded. *In* the basement boulder clay at the foot of the cliffs.
Rhomb-porphyry. 18 × 14 × 14 inches. Rounded.

NOTE.—The augite-syenite is one of the largest so far found in Britain. It rarely happens that rhomb-porphyry is found of the size of the one referred to.

EASINGTON.

Shap granite. 12 × 10 × 8 inches. Rounded.
Rhomb-porphyry. 5 × 4 × 3 inches. Rounded.

NOTE.—These were obtained from a heap of boulders which had been carried from the beach, and now in Mr. Hewetson's garden. Boulders of all sorts are very common in this village; the church is built of them. In front of Mount Pleasant is a good selection of boulders and fossils from the beach, including granite, gneiss, basalt, rhomb-porphyry, augite-syenite, carboniferous limestone, ganister, basement carboniferous conglomerate, brockram, magnesian limestone, lias, secondary nodule with *Crioceras* (? Speeton clay), black and pink flints, etc.

HORNSEA.

Shap granite. A pebble found *in the purple boulder clay cliffs* about 200 yards N. of the New Parade.

PATRINGTON.

Hundreds of large boulders, usually well water-worn, all over the village as corner-stones, steps, and built into walls. Several paths are paved with smaller boulders. They include basalt, gneiss, porphyrite, an occasional rhomb-porphyry, carboniferous limestone and sandstone, lias, flint, etc. In all probability they are from the beach, although some may be from the fields adjacent.

SKEFFLING.

Houses and barns, the wall round the church, etc., are built of boulders of the type referred to above.

WEETON.

Gneiss, basalt, carboniferous limestone, lias, etc., plentiful, principally built into walls. Around the pond in the centre of the village are several boulders between one and two feet in diameter, principally basalts, although lias and carboniferous limestone are represented. Some have a flat surface, though no well-defined striæ are visible. An old inhabitant says stones are frequently taken from the fields to the village, but the bulk were probably from the beach.

WELWICK.

Boulders plentiful here, as might be expected. Paths are constructed of beach pebbles and boulders. On the road-side just S. of the village, close by a stone-heap and now probably broken up for road metal.

1. **Basalt.** 33 × 30 × 21 inches.

One side flat, striated, and almost polished.

WITHERNSEA.

Foliated compact blue gneiss. 36 × 30 × 12 inches. Subangular.

Shap granite, small boulder on the beach.

Shap granite, larger boulder in a garden near the 'Spread Eagle' Hotel. Has probably been collected from the beach.

In view of the remark by Mr. J. W. Stather, F.G.S., in the British Association Report on Erratic Blocks, for 1897, to the effect that the chalk belemnites found in the boulder clays of Holderness are of a different type from those which occur in the Yorkshire chalk, I recently took advantage of a month's stay on the coast, at Withernsea, to confirm Mr. Stather's observation. During that time some three dozen specimens were collected from the boulder clay cliffs and the beach (though principally the latter), and not a single individual can

be referred to *B. quadrata*, the belemnite common in the Yorkshire chalk; they all appear to be of the *B. lanceolata* type. This species has not so far been recorded in the chalk of this country. I have also had an opportunity of examining a series of fairly perfect specimens in the collection of Mr. George Miles, of Withernsea, and amongst these examples the same fact is noticeable.

Whilst at Withernsea also I obtained a collection of about 20 flint casts of echinoderms, usually in *black* flint. There are at least four species, and perhaps five, including *Ananchytes*, *Micraster*, Discoidea (?), etc. The commonest example resembles a small *Ananchytes ovatus*. Like the belemnites, these flint echinoderms have not been found in the Yorkshire chalk; nor has the *black flint*, from which they have evidently been derived.

The finding in such profusion of chalk fossils so foreign to the neighbouring chalk is very interesting, and opens out new problems to solve.

BOULDERS OBSERVED ON THE EXCURSIONS OF THE YORKSHIRE NATURALISTS' UNION.

Hexthorpe Flats, near Doncaster.

Carboniferous limestone (with *Encrinites*). 32 × 25 × 9 inches. Well striated on the top, sub-angular, resting on magnesian limestone.

Dimlington and Easington.

Shap granites. One pebble and three fairly large boulders; all well rounded. Rhomb-porphyry. 16 × 16 × 12 inches.

Reported by Mr. J. W. Stather, F.G.S.

Scalby Mills, near Scarborough.

When making the new rifle range near here, in September 1897, the following section in boulder clay was visible:—

Upper clay (red)	20 feet.
Lower clay (grey)	20 feet.
	40 feet.

Of the many hundreds of boulders thrown aside by the workmen, from 50 to 75 per cent. were estuarine sandstone from the adjacent beds. The remainder consisted of carboniferous rocks, whinstone, a few nondescript igneous types, and some secondary rocks, among which were two planed and striated boulders of chalk, each about 8 feet in diameter.

Note.—This locality is about 20 miles north of Flamborough Head.

BURNISTON, NORTH OF SCARBOROUGH.

In the bay (1 mile long) between Cromer Point and Long Nab, the following group of boulders of Shap granite was noted in September 1897.

The following occurred south of the lane descending from Burniston fields:—

1. 4 × 3 × 3½ feet.
2. 4 × 3 × 3 feet.
3. 4½ × 3 × 2 feet.

North of lane.

4. 1½ × 1¼ feet × 8 inches.
5. 4 × 3 × 3 feet.
6. 4 × 3 × 2½ feet.
7. 2½ × 2 × 1½ feet.
8. 3 × 2½ × 2½ feet.

Also immediately north of Long Nab.

9. 4½ × 3 × 2½ feet.
10. 2½ × 2 × 2 feet.

Half-way between Long Nab and Hundale Point.

11. 6 × 5 × 5 feet.

CLOUGHTON, NORTH OF SCARBOROUGH.

A thin coating of drift covers the rock at the grit quarries west of this village. A few foreign pebbles were noted, amongst which was a pebble of hard chalk.

HOLDERNESS.

During the Kilnsea Meeting of the Yorkshire Naturalists' Union, August 1898, three previously unrecorded boulders of Shap granite were noted on the beach near Easington; also several specimens of *Belemnitella lanceolata*.

NOTE—TRICHOPTERA.

***Colpotaulius incisus*, a Trichopteron new to Yorkshire, etc.**—On July 25th, and again on August 20th, Mr. S. L. Mosley and I visited Shepley Mill Dam, an old reservoir literally choked with bulrushes, several miles out of Huddersfield. The sweeping net soon discovered that *Colpotaulius incisus* was a common occupant of the 'dam,' and that it was accompanied by *Limnophilus stigma*. On the second visit the variable *L. stigma* occurred in great profusion, whereas, previous to the first visit, I had only taken a single specimen in the district. Whilst I was working the trichoptera, Mr. Mosley paid attention to the lepidoptera, and soon secured several specimens of *Orthotælia sparganiella*, a species new to West Yorkshire. On August 13th, when working Askham Bogs, near York, with the Rev. C. D. Ash, I found that *Col. incisus* was also common there among the herbage on a ditch side.—G. T. PORRITT, Crosland Hall, Huddersfield, 4th November 1898.

NOTES—ORNITHOLOGY.

Sclavonian Grebe in the East Riding.—On 30th November I had a fine male specimen of this bird (*Podiceps auritus* L.) brought to me. It had been shot on flood water about forty miles from the sea, as the crow flies. On preserving it I found the stomach full of its own body feathers, and the elytra of various water beetles.—OXLEY GRABHAM, Heworth, York, 11th December 1898.

St. Mary's Island Lighthouse.—The new lighthouse on St. Mary's Island, lighted for the first time on the 31st of August this year, has already been destructive to many of the wild fowl of our Northumbrian coast. Mallards (*Anas boscas*), Woodcock (*Scolopax rusticola*), and a Storm Petrel (*Procellaria pelagica*) were recently picked up. The latter bird is not at all common on our coast.—H. T. ARCHER, Newcastle-on-Tyne, 13th Dec. 1898.

Curlew's Nest with Nine Eggs.—On 9th May last, a keeper friend of mine found a Curlew (*Numenius arquata*)'s nest, containing seven eggs, in a desolate part of Westmorland, and two days later I, by arrangement, accompanied him to the spot. On our way there we naturally discussed the probability of the eggs having been laid by two or more birds, but I was assured that all the eggs were exceedingly alike. When we arrived at the place, which was marked, the sitting bird did not attempt to rise, but allowed an approach of within two yards. Her wings were spread out like a broody hen's, and as we stood watching her some of the eggs were plainly seen. When the bird eventually arose no less than nine eggs were found to be in the nest; these I took there and then, replacing them by four other Curlew's we had taken on the way there, but on again proceeding to the spot some days later, I found that she had not taken to them. On examination, the whole of the eggs were quite fresh, and there was nothing, so far as incubation was concerned, to denote any difference in the eggs, which have a general resemblance, as all, or nearly all, Curlews' have. I have, however, come to the conclusion that they are the joint product of three birds, one laying the full complement of four, another bird three, and the third two. It is extremely unlikely that the nest had been added to by a friendly hand for a practical joke, as the place is a very remote one and miles from the nearest habitation, and in my own mind there is not the slightest suspicion that the keeper had tampered with it, I having known him for some years. The occurrence is so unusual you may deem it sufficiently noteworthy of being recorded.

The day following the one I took the Curlew's eggs, I found a deserted Lapwing (*Vanellus vanellus*)'s with seven, many miles from the other place. The eggs had been partly 'examined,' by a Carrion Crow apparently. – DAVID WELBURN, Castle Lodge, Bishop Auckland, 20th Nov. 1898.

Vernacular Names of Birds at Skelmanthorpe.—The following are a few of the local names for birds used in this district. Meeting a boy one day last summer with a dead Chiffchaff (*Phylloscopus rufus*) in his hand, I told him that if the policeman saw him he would have to go to Barnsley Police Court. 'Nay,' he said, '"Peggys" are not in the list which the policeman brought to our school.' Having occasion to go to the school some time later, I asked the schoolmaster to write the local names alongside the real ones. He willingly did so, and some of the scholars were surprised to find that birds which they had often read about they had been familiar with for years, but under another name: –

Corn Crake, 'Dress Drake.'
Night Jar, 'Gabble Ratch.'
Swift, 'Devil's Bitch.'
Wren, 'Runt.'
Magpie, 'Pynet.'
Starling, 'Shep.'
Lesser Redpole, 'Chivy Linnet.'
Chaffinch, 'Spink.'
Yellowhammer, 'Yoldring.'
Meadow Pipit, 'Chit Lark.'
Long-tailed Tit, 'Feather Poak.'
Chiffchaff, 'Peggy.'
Sedge Warbler, 'Small Straw.'
Whinchat, 'ächat.'
Wheatear, 'Wallchat.'
Fieldfare, 'Fellferds.'
Missel Thrush, 'Stormy.'

– FRED. LAWTON, Common End, Skelmanthorpe, near Huddersfield, 8th November 1898.

Naturalist.

BIRD-NOTES FROM THE HUMBER DISTRICT.

JOHN CORDEAUX, J.P., F.R.G.S., M.B.O.U.,

Great Cotes House, R.S.O., Lincoln; Ex-President of the Yorkshire and Lincolnshire Naturalists' Unions.

(Continued from 'The Naturalist' for August 1898, p. 239.)

In compiling these notes, I have once more to express my indebtedness to my friend, Mr. G. H. Caton-Haigh, of Grainsby Hall, for having let me have copies of his notes on the movement of birds in his district.

The season in some respects has been remarkable, chiefly from its meterological conditions in the absence of high winds and storms, the very regular temperature, with fine, dry, and settled weather. Birds have come in almost continuously in small numbers, day by day, but without in any way approaching to the great 'rushes' so commonly experienced at this season.

Loxia curvirostra L. **Crossbill.** A considerable number in the Spurn district in August. Mr. Philip Loten had several brought to him, both crimson males and orange-green females.

Machetes pugnax (L.). **Ruff** and **Reeve.** Mr. Haigh saw four Ruffs near Tetney Haven on 20th July. On 3rd August, when in company with Mr. Haigh, we saw two Ruffs and four Reeves in the bed of an old creek. These, which were very unsuspicious of our presence, were wading amongst sedges in shallow water searching for food. In the same place were Mallard, Teal, Shoveler, Coot and Waterhens, Common Sandpiper, Dunlin, about ten couples of Snipe, Heron, and some scores of Reed and Sedge Warblers. These creeks are strictly preserved and kept very quiet, hence the abundance of bird life.

Alcedo ispida L. **Kingfisher.** 1st September. Mr. Haigh saw one at North Cotes sluice outfall. I have seen many during the autumn, and they have been unusually plentiful in drains, streams, and ponds all over the low-lying districts of North Lincolnshire.

Podicipes cristatus (L.). **Great Crested Grebe.** 5th Sept. Mr. Haigh saw five in splendid plumage on the sea between Donna Nook and Saltfleet Haven. Also on the same day many thousands of Scoters.

Hydrochelidon nigra (L.). **Black Tern.** 5th September. E. Seen on coast. This Tern is a regular autumn migrant, although it can hardly be considered common.

Sylvia nisoria (Bechstein). **Barred Warbler.** 5th Sept. E. since morning of 4th. Mr. Haigh shot an immature female close to the coast, amongst some brambles, at North Cotes. This makes the fifth example in fifteen years in the Humber district, namely, four in Eastern Yorkshire and one now in Lincolnshire.

Phalaropus hyperboreus (L.). **Red-necked Phalarope.** 7th Sept. One was shot by Mr. Haigh in a creek at Tetney.

Turtur communis Selby. **Turtle Dove.** This is now quite an established species in North Lincolnshire. On 7th Sept. about a score were left in the sea plantation at Tetney.

Throughout September the weather continued remarkably still and fine—quite a second summer. The smaller immigrants came in continually in small numbers. The various movements are best shown by the following notes from Mr. Haigh's diary.

9th Sept. S.W., light wind, hot. Whitethroats numerous. Willow-Wren, Redstart, Sedge-Warblers, Blue Tits; a few Yellow Wagtails, 20 to 30 in one hundred acres. Meadow Pipits abundant.

12th Sept. W., light, fine. Whitethroats numerous. Two Redstarts, a Willow-Wren, Yellow Wagtails (about twenty). One Little Stint and several Curlew Sandpipers.

14th Sept. W., light, fine. Whitethroats still common. One Redstart, a few Blue Tits. Some Blackbirds and Thrushes.

15th Sept. E., light, fine. Wheatears very abundant.

16th Sept. E.S.E., fresh. Whitethroats scarcer. A few Blue Tits, Redstarts, Thrush, Wheatears, Pied and Yellow Wagtails, and several Pied Flycatchers.

17th Sept. E.S.E., fresh. Pied Flycatchers fairly numerous. Several Redstarts, very few Whitethroats. Thrushes, Robins, Pied Wagtail, Meadow Pipits, Wheatears, and Kestrels.

22nd Sept. N., light and fine. Redstart, Whitethroat, Whinchat, many Meadow Pipits, several Golden Plover, and Curlew-Sandpiper.

26th Sept. S.W. One Turtle Dove in park at Grainsby.

28th Sept. W., fresh. Redstart, Sedge Warbler, Goldcrest,

and Reed Bunting; several Robins and Thrushes; a few Mistletoe Thrushes. Shot two couples of Jack Snipe, and saw a few Common and Curlew Sandpipers.

The most interesting items are the Pied Flycatchers on the 16th and 17th.

13th Sept. When on the Yorkshire coast to-day, with Mr. Hedley, of Haileybury College, we saw and identified Gannet, Arctic and Common Terns, Guillemot, Red-throated Diver, Cormorant, Grey Geese, Scoter, various Ducks, Gulls (of three or four species), many Skuas, Oyster-catchers, and Sanderlings.

Numenius arquata (L.). **Curlew.** Common in September and October on pasture lands in the river marshes. They are called here 'Harvest' Curlew, from coming at the time of corn cutting.

Limosa lapponica (L.). **Bar-tailed Godwit.** 14th September. First observed on the foreshore. It has been a most abundant species during the autumn, and very numerous on the Yorkshire coast and the Spurn muds. There are no Curlew-Sandpiper or Little Stint recorded from the Spurn district.

Lusciniola schwarzi (Radde). **Radde's Bush Warbler.** At the meeting on 19th October of the British Ornithologists' Club in London, Mr. Haigh exhibited an example of this East Siberian species, which, after much careful watching, he obtained on 1st October from a hedge at North Cotes, near the coast. Mr. Haigh was first attracted by the very peculiar and loud note of the bird, which he said was equal to that of one several times the size, and it is curious that the Russian Godlewski makes mention of the same fact. *L. schwarzi* has hitherto not been recognised west of Tomsk in Eastern Siberia, so that its occurrence in the Humber district is the more remarkable. The bird will shortly be figured and described in the 'Ibis.'

Anser cinereus Meyer. **Grey-lag Goose.** 10th October. A solitary Grey-lag shot by Mr. Haigh on the coast to-day is the most handsome I have seen. The plumage is particularly clear and bright, specially so the lavender-grey rump and wing coverts. The under parts are much mottled with black. Bill like wax, the nail white, the rest pinky-yellow, legs and feet delicate flesh colour, irides brown, orbital-ring red. Grey Geese are more numerous this season than

usual, to judge by the flights which from time to time pass between the coast and the high wolds.

Cygnus musicus Bechstein. **Whooper.** 6th October. E. Mr. Haigh shot an adult on the coast at North Cotes this evening. This is a very early date for the Wild Swan to appear.

Gallinago cœlestis (Frenzel). **Common Snipe.** 1st October. First flight of foreign immigrants.

Gallinago gallinula (L.). Jack Snipe, came in about the same date.

Vanellus vulgaris Bechstein. **Lapwing.** 1st Oct. Mr. Haigh reports Green Plover at North Cotes passing all day till after 5 p.m. to N.W. At Easington on the 15th I observed many coming in from the East. At Great Cotes on the 18th almost continuous flights from the East. On 2nd December, W., very strong, I saw an immense concourse of Lapwing in a pasture near the Humber. The birds were sitting very close together and with their heads towards the wind. This field is thirty-two acres, and one-third of the area was densely covered. I do not think there could be less than 30,000 to 35,000, and these figures are less than the estimate I formed at the time. An old marsh shepherd said he had never in his life seen so many 'Pyewipe' together. I believe the whole body of birds were immigrants, and probably had just come in.

Anthus obscurus (Latham). **Rock Pipit.** 6th October. Mr. Haigh writes: 'Dozens on the "fitties" at Tetney to-day.'

Parus ater L. **Coal Tit.** 6th October. One which I saw in a standard rose in the garden is undoubtedly referable to the continental form, having a pure slate-grey upper back and no trace of brownish as in *P. britannicus* in winter. I watched it for some minutes at a few feet distance. Many Coal Tits appeared in the Easington gardens early in October, but only remained a few hours.

Regulus cristatus K.L.Koch. **Gold-crested Wren.** 6th Oct. E., light, cloudy. Scores of these tiny immigrants in the sea hedges at North Cotes. In the Spurn district immense numbers during the first fortnight in the month, and especially so on the 15th, as I observed between Easington and Kilnsea. The wind S.S.E. and very strong. There has been no such arrival of Gold-crested Wren since the memorable invasion on 14th and 15th October 1892.

Erithacus rubecula (L.). **Robin.** Great numbers both in East Yorkshire and Lincolnshire at the same times as the preceding, and scarcely second to these were the

Hedge Sparrows, *Accentor modularis* (L.).

Sylvia atricapilla (L.). **Blackcap.** 6th October. An adult male was got at North Cotes by Mr. Haigh. The Blackcap, although not common on migration, occurs later in the year than any other of the warblers.

Turdinæ. With the single exception of the Ring-Ouzel, all the Thrushes have been largely represented — the hedges, copses, and turnip fields swarming with Mistletoe Thrushes, the Song Thrush, and Blackbird, but the Thrushes much in excess. Later came Redwing and Fieldfare. The Mistletoe Thrushes arrived from early in September; Blackbirds and Thrushes from the middle of the month; Redwings early in October; and Fieldfares from the 14th. On 3rd December, from 2.30 to 3.30 p.m., large flights of the latter were crossing this parish (Great Cotes) from N. to S., flying at a great height, but readily identified by their constantly repeated calls of yack-chuck-chuck. Comparatively few Ring-Ouzels have been observed either in East Yorkshire or Lincolnshire.

Dendrocopus major (L.). **Great Spotted Woodpecker.** 12th October. A boy brought to Mr. Haigh a young bird of this species which he had found dead on the seabank.

Corvus cornix L. **Hooded Crow.** 7th October one, on 10th and 12th a few—has been scarcer in October, but increasing in November to the end of the month, when the main body arrived. Amongst these last arrivals were a few of those very light-coloured birds, in which the smoke-grey is inclined to white. [See 'Naturalist,' 1896, p. 7.]

Rooks, Starlings, and **Larks.** 14th to 24th October. A large daily immigration from E. to W. On the 14th Mr. Haigh has a note from North Cotes: 'Starlings in clouds.' On the 18th, when driving in the Humber marshes, I saw an enormous flock, probably just come in. They spread across the road in a black mass, sitting very closely, and extending right and left for some distance into the adjoining fields. On rising, the noise of their wings was as the roar of many waters, and so dense was the throng that, although I tried my best, I could see nothing through or beyond them. The whole of the vast assembly took off to the north-west.

Hirundo rustica L. **Swallow.** 16th October. Several this afternoon were hawking over the pond at Easington. Mr. Haigh saw a single Sand Martin in his park at Grainsby on the 11th.

Scolopax rusticula L. **Woodcock.** 15th and 17th October. S.S.E., S.E., E.; heavy sea. First flight Yorkshire coast. Four Woodcocks shot in or about Easington gardens were all in high condition, two of them remarkably fat, heavy birds. In each case the notch-like markings on the outer web of first primary were nearly lost, so I judged them old birds. It is curious how persistent is the error, even amongst sportsmen, that Woodcocks on their first arrival are in poor condition; I have invariably found the opposite.

Fringilla montifringilla L. **Brambling.** 14th October. Mr. Haigh saw one at North Cotes. There was a flock on some stubbles near the sea at Easington on the 17th.

Acanthis cannabina (L.). **Linnet.** 15th October. Thousands on the coast between Easington and Kilnsea.

Lanius excubitor L. **Great Grey Shrike.** I have notes of four having been seen, two of these being on Kilnsea warren.

Phalaropus fulicarius (L.). **Grey Phalarope.** 4th November. One was shot at Easington. Another in the Lincolnshire marshes about the middle of October.

Passer montanus (L.). **Tree Sparrow.** 6th November. A considerable immigration about this date at Great Cotes.

Columba palumbus L. **Ringdove.** 7th November. There is a young bird in a purple beech near the house which is regularly fed by the parents.

Porzana maruetta (Leach). **Spotted Crake.** 10th November. One shot near Easington and taken to Mr. Philip Loten.

Ruticilla titys (Scopoli). **Black Redstart.** 11th November. One shot near Easington and taken to Mr. Loten.

Otocorys alpestris (L.). **Shore Lark.** Fairly common in the Spurn district in October and November.

Besides those birds which appear in the list there has been a marked increase in the number of Great and Blue Tits and the Common Wren in the hedgerows of the coast districts, suggestive of migratory movements either local or from the continent. So far I have not seen any Snow Bunting. There are large flocks of immigrant Greenfinches and Chaffinches in the stubbles.

NEW BRITISH FUNGI
FOUND IN WEST YORKSHIRE.

H. T. SOPPITT AND C. CROSSLAND,
Halifax.

Barlæa modesta (Karst.), Karsten, Mon. Pez. Fenn., p. 122; Karst. Myc. Fenn., I., p. 64; Cooke's Mycogr., f. 33; Sacc., Syl., VIII., n. 426. Sessilis, subgregaria, planiuscula, vix marginata, sicca decolorata et lutescens (in statu vivo subaurantiaca-lutea ni fallor); ascis cylindraceis; sporidiis sphæroideis, papilloso-asperulis, uniguttulatis, 18-20 μ diam.; paraphysibus apicem versus incrassatis.

Hab. in sabulosis in Fennia.—Ascoma. 1-2 mm. lat. (Sacc. l.c.).

Among hepatics on sandy soil, bank of stream, Wade Wood, Luddenden Dean, near Halifax, T. W. Woodhead, October 1898. Distinguished among the British species of *Barlæa* by its larger size and spine-clad spores. Our specimens were 2-3 mm. diameter.

Humaria rubens Boud., Bull. de la Société Mycologique de France, 1896, p. 13, Tab. III., fig. 1. British specimens were first found by James Needham growing among moss on wall top, Nut Clough, Hebden Bridge, Oct. 1896. Mr. Needham also succeeded in collecting more of it among moss on the ground in Crimsworth Dean, near Hebden Bridge, 4th June 1898. The Nut Clough specimens were identified by Mr. G. Massee, F.R.M.S., of the Royal Herbarium, Kew. M. Boudier's original description not being accessible to us at the moment of writing, we give a few notes taken from the specimens we first examined, which may enable local students to recognise this species from other small red Peziæ.

Ascophore sessile, 1-1¼ lines across, gregarious or scattered, dingy orange-scarlet, glabrous, rather fleshy, flesh ¼ of a line thick, at first hemispherical, then expanded, disc almost plane, margin entire, cells of excipulum oblong-elliptic, 30-40 × 20-25 μ, smaller towards hymenium and cortex, sparingly intermixed with strings of irregularly swollen, septate hyphæ of much less diameter, cortical cells 8-10 μ, subglobose, giving rise near the base to short hyaline, septate hyphæ 5-6 μ thick; asci cylindrical, 260-290 × 16 μ, apex rounded, spores when mature occupy about $^{3}/_{5\text{ths}}$ of the space; spores 8, obliquely uniseriate, broadly elliptical, smooth, 16-18 × 12-14 μ, uniguttu-

late, guttæ large, rarely two smaller; paraphyses septate, apex swollen, 8-9 μ thick, filled with orange granules, 4 μ thick below.

In the Crimsworth Dean specimens the ascophores were 2 lines across, disc bright-orange-scarlet; asci 200-210 × 15-16 μ; spores 18-19 × 13-14 μ.

This species has a similar habit to *Barlæa Crouani* (Cooke), viz., that of growing embedded in moss, and may easily be taken for it by pocket-lens examination if not carefully looked at. *B. Crouani,* however, when mature and in good condition, has a thin, pale, well-defined, entire or slightly-jagged margin which distinguishes it from this one.

Humaria deerata Sacc., Syl., VIII. n. 550; *Peziza deerata* Karst., Mon., p. 119; *Helotium Pedrottii* Bresadola; *Pseudombrophila Pedrottii* (Bres.) Boudier.

On decaying flax-lining of a cast-out hearth-rug. Pecket Wood, near Hebden Bridge, June 1897, J. Needham.

The specimens were very abundant. The growth of the hymenium in this species is remarkably luxuriant; concave at first, prominently convex when mature, sometimes wrinkled and slightly umbilicate, and with the margin strongly revolute, literally turned inside out. The disc is minutely papillose with projecting tips of asci which impart to it when partially dry a finely pruinose appearance. The exterior is radially streaked with thin, closely adpressed lines of brown, septate, thin-walled, flexuous hyphæ, 80-120 × 4-5 μ, with upper cell almost hyaline, apex rounded. The excipulum is composed of densely interwoven, hyaline, curly, branched hyphæ, 4-6 μ thick, these give place at the cortex to rotund-polygonal, ochrey-brown cells, 10-24 μ diam., from which spring the lines of brown hyphæ. Our spore diameters are 14-16 × 8-9 μ (Karsten's 10-14 × 7-8). The spores occupy about half the ascus; paraphyses often branched. Well developed ascophores bear a strong external resemblance to sessile forms of *Ombrophila clavus,* while the internal structure, with the exception of the broadly-elliptical spores, approaches *Mollisia.* Boudier founded a new genus, *Pseudombrophila,* on Bresadola's species. Massee considers this to be a *Mollisia.*

Mollisia pteridina Karst., Myc. Fenn., I., p. 194; Sacc., Syl., VIII. n. 1446; Subgregaria, sessilis, concava v. concaviuscula, pallida v. pallido-umbrina, margine subcrenulato inæquali, 0·2-0·4 mm. lat; ascis cylindraceo-clavatis, 35-45 × 4-5 μ, obturaculo, minuto jodo obsolete cærulescente; sporidiis elongatis v. aciculari-elongatis, rectis, vulgo guttulatis, 5-10 × 1-2 μ.

Hab. ad stipites Pteridis aquilinæ vetustos in regione Aboensi Fenniæ (Sacc. l.c.).

On decaying fern stems, High Greenwood, Heptonstall, May 1897. The exterior in our specimens is minutely reticulated with black ridges.

Ascobolus Leveillei Boud., Mém. sur les Ascoboles, p. 35, t. VII., f. 16; Sacc., Syl., VIII., n. 2153. Minutus, congestus, brunneus, extus opacus et minutissime furfuraceus, 1 mm. lat., subpiriformis, semimmersus; ascis longissime exsertis, amplis, clavatis, 180 × 30, octosporis; sporidiis distichis obtuse ellipsoideis, hyalinis, dein brunneis, 25-27 × 16, episporio leviter reticulato; paraphysibus filiformibus, apice vix incrassatis.

Hab. in stercore equino prope Paris Galliæ et in Germania. Ascis gelatina sulphurea interposita longe exsilientibus facile distincta species. Asci jodo cœrulescent, episporium violascit. (Sacc. l.c.)

In immense numbers on horse dung, Copley, near Halifax, November 1898. Easily known by its small size, colour, densely gregarious habit, and especially by its smooth spores. In our specimens the excipulum is parenchymatous, cortical cells rotund-polygonal, 15-20 μ diam.; asci 140-160 × 28-30 μ; spores occupying nearly all the space, epispore to all appearance permanently smooth; paraphyses cylindrical, 3·5 μ thick, apex not thickened.

Ascobolus* (*Sphæridiobolus*) *Crosslandi Boudier, Bulletin de la Société Mycologique de France, tome XIV., 3e Fascicule, pp. 126-127. 'Minutis, 0 mm. 50 usque et 1 mm. 50, luteo-virens, glaber marginatus, sporis striatis, perfecte sphæricis, violaceis.

Receptacula extus glabra aut vix minute furfuracea, primo rotundata, dein hemispherica, posteaque expansa, luteo-virentia, margine irregulariter dentato, hymenio pro more thecis maturis nigro punctato; paraphysis septatæ, ad apicem incrassatæ 6-10 μ crassæ, et ut thecæ gelatina lutea immersæ; thecæ octosporæ, late clavatæ, ad basim paululum attenuatæ, 170-200 μ longæ, 25 circiter latæ; sporæ perfecte globosæ, pulcher et intense violaceæ, dein fuscescentes, striatæ, 16-18 μ crassæ. Halifax, Angliæ, Nov. 1897. Ad stercus caninum.' (loc. cit.)

Boudier adds: 'This pretty species is above all remarkable for the entirely sphærical shape and lovely violet colour of its spores. It comes under my genus *Sphæridiobolus*, based upon the *Ascobolus hyperboreus* of Karsten, which is distinguished from this by the paler colour of its spores. Now, in the species I am describing their striæ and their deep colour make them so nearly like the typical Ascobolæ that one can really only class them separately as a sub-genus. In fact the spores, although perfectly round, are equally a beautiful violet, striate and not verrucose. These striæ are simple or branched, are longi-

tudinal and form by their direction two distinct poles. The ascophores are nearly glabrous, with the margin a little crenulate. The colour is uniformly that of the true Ascobolæ, viz., a greenish yellow, a little darker on the hymenium, as is common in this genus, being spotted with black by the protruding asci filled with ripe spores.'

Salterhebble, near Halifax, October and November 1897.

Several fully expanded ascophores measured 2 mm. across. Our measurements of asci were 130-170 × 16-20 μ, and spores 12 μ. Cortical cells sub-globose, 16-24 μ diam. Ascophores blackish-brown when dry.

Saccobolus granulospermus sp.n. Receptacula sparsa aggregatave, perminutæ, 0·3-0·5 mm. lata, sessilia, carnea, glabra, lurido-lutea, fuscescentia in statu siccitatis, primum subglobosa, demum expansa, disco plano, nigro-punctato cum ascis projectentibus; ascis late clavatis vel cylindrico-clavatis, 100-110 × 35 μ, subito angustatis in pediculus brevibus ad basin, apicibus rotundatis incrassatisque; spores 8, ellipticus, polis obtusis, primum hyalinis et levibus, tum roseo-lilacinis, demum violaceis et subfuscescentibus, granulis minutis, 20-22 × 9-10 μ, sacculo oblongo intra membraneum proprium inclusis; paraphysibus simplicibus vel ramosis, septatis, luteis, apicibus clavatis, curvatis, lat 6 μ (4 μ infra).

Hab. in fimo bovino, Harewood, near Leeds, September 1898, Yorkshire Naturalists' Union Fungus Foray.

Distinguished more especially by the finely granular epispore and the markedly curved apices of the paraphyses. The 8 spores are grouped in four pairs in two series as in *S. Kerverni* (Crouan), to which this closely approaches. In all the other species of the genus they are arranged in two rows consisting of three spores placed end to end, and one row of two laid on the juncture. The ascophores bear an external resemblance to *S. Kerverni* with the exception of being a little darker, but differ in the spores being rather smaller and finely granulose, and not the least fusoid or wrinkled.

EXPLANATION OF FIGURES.

Figs. 1-8, *Humaria decrata* Karst.; fig. 1-4, ascophores and sections of do. × 5 diameters; fig. 5, asceus, spores, and paraphyses; fig. 6, excipulum cells; fig. 7, cortical cells; fig. 8, hyphæ; figs. 5-8 × 350 diameters. Figs. 9-13, *Ascobolus Crosslandi* Boudier; fig. 9-10, ascophores and section × 5 diameters; fig. 11, asci, spores and paraphyses × 350 diameters; fig. 12, cortical cells × 350 diameters; fig. 13, spores (after Boudier) × 350 diameters. Figs. 14-17, *Saccobolus granulospermus* sp. n.; fig. 14, ascophores × 5-6 diameters; fig. 15, section × 15 diameters; fig. 16, asceus, spores and paraphyses × 350 diameters; fig. 17, spore × indef. Figs. 18-21, *Mollisia pteridina* Karst.; fig. 18, ascophores in different stages of development, and section × 15 diameters; fig. 19, asceus, spores, and paraphyses × 350 diameters; fig. 20, spores × indef.; fig. 21, portion of ascophore showing the subcrenulate margin × indef. All from nature except the two spores after Boudier.

C. CROSSLAND. DEL.

January 1899.

NOTES—LEPIDOPTERA.

***Orthotælia sparganiella* near Huddersfield.**—While collecting with me at Shepley Mill Dam, 20th August, Mr. S. L. Mosley secured several specimens of this addition to the list of West Yorkshire Lepidoptera.—G. T. Porritt, Crosland Hall, Huddersfield, 4th November 1898.

***Xylophasia scolopacina* at Huddersfield.**—This insect many years ago seems to have been fairly common in a wood near Huddersfield, but of late years has scarcely been seen. This year it was widely distributed over the district, and I took it even in my own garden.—Geo. T. Porritt, Huddersfield, 4th November 1898.

NOTES—MAMMALIA.

Curious Malformation in Teeth of Rabbit.—Last week a keeper in a wood near here killed a rabbit (*Lepus cuniculus*), which had been driven out of its hole by a ferret. On examination, both upper and lower incisors were found to be curiously malformed. The lower ones project from the lower jaw, but slightly upwards, and are exposed for a length of 20 mm. The upper ones have grown completely round the upper lip and have the points buried in the fur. As one consequence of this 'ornamentation' the poor possessor of these dental curiosities was not in the best condition, although about six months old.—E. G. Bayford, Barnsley, 23rd November 1898.

Cave Finds in Ribblesdale.—At Horton, travellers speeding towards the Scottish border by Settle and Carlisle, will have noticed on the opposite side of the valley to where Penyghent holds vigil the high southern scars of Moughton, painted, as it were, by the débris from the quarries above, which at this point are worked at an altitude of 1,620 feet above sea level, the upper beds of limestone resting upon upturned Silurian slates, which present an interesting geological object-lesson. At the north end of this quarry during summer the action of blasting the face of rock disclosed the presence of a cave, estimated by the workmen to be upwards of 20 yards in length, the height at the entrance being about 15 feet. Quarrying has been carried on here for some time, so that the mouth of the present cave will be upwards of 65 yards from the face of the former cliff edge. Evidence, however, seems to show that at some remote period one continuous gallery opened to the former face of rock and followed a somewhat circuitous course, along which workmen found, in quarrying, many miniature pocket caves, the cave-earth not having altogether filled up the channel. At the mouth of the present cave a number of bones were brought to light. Lot No. 1 contains 14 bones referable to the following species:—1, right femur, Bear (*Ursus ferox*); 2, tibia, fragment, Bear; 3, ulna, Bear; 4, radius, Bear; 5, ulna, Bear; 6, tibia, Bear; 7-8, young, probably Bear; 9, Bear; 10, one tooth, Bear; 11, rib of Wolf (*Canis lupus*); 12, fragment, Fox (*Canis vulpes*); 13-14, lower mandible, fragment, Wolf; 15, fragment, Deer (Victoria Cave). Lot No. 2, 33 bones, referable as follows:—Nos. 1, 2, 3, 4, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 24, 25, 27, 29, and 33, Bear; Nos. 5, 6, and 26, Hyæna; No. 7, Horse; Nos. 8, 22, and 28, Wolf; No. 13, Sus; No. 14, Fox; Nos. 31 and 32, —.

Both collections were kindly verified by Mr. Wm. E. Hoyle, M.A., of the Owens College Museum, Manchester, who will retain both collections for that museum.

At present the cave is blocked by débris. Upon its removal, no doubt further exploration will reveal additional evidence of the life that once flourished during those remote cycles of time when tropical forests covered these now Highland solitudes where now the perfect peace of nature reigns.

I am also indebted to the works and business managers of the Ribblesdale Co., to Messrs. W. Cudworth, of Bradford, and S. Ashworth, of Leeds, for assistance ungrudgingly given.—J. Walling Handby, Austwick, Lancaster, 26th November 1898.

BIRD-NOTES FROM THE HUMBER DISTRICT.

JOHN CORDEAUX, J.P., F.R.G.S., M.B.O.U.,

Great Cotes House, R.S.O., Lincoln; Ex-President of the Yorkshire and Lincolnshire Naturalists' Unions.

(Continued from 'The Naturalist' for January 1899, p. 26.)

Mr. Haigh forwards further notes from 28th October to 16th November 1898.

28th October. S., light, fine. Many flocks of Rooks. Jackdaws also in some of the flocks. Thrushes, Blackbirds, and Redwings numerous. Large flocks of House Sparrows near the sea-bank. Several Kestrels and a Merlin, also clouds of Knot on the coast.

31st October. S.W., strong, showery. Landrail shot. Many Thrushes in turnips and one Brambling seen.

2nd November. S., gale, rain. At North Cotes, a few Tree-Sparrows, Bramblings, Blue-Tits, Fieldfare, and many Yellow-Hammers.

3rd November. W., strong, fine. Large flocks of House Sparrows and a few Tree Sparrows, Rooks, and Larks coming in at North Cotes. In the hedges Blue-Tits, Chaffinches, Mistletoe Thrushes, Song Thrushes, and Redwings. One or two Sparrow Hawks.

4th November. S.W., strong. A Grey Wagtail at Grainsby.

7th November. S.E., light. Lapwings and Fieldfare going South. One Woodcock seen, and a Long-eared Owl flushed from a ditch.

8th November. S.E., light. A few flocks of Lapwing to the South, also Larks. Found the feathers of a Short-eared Owl on sea-bank. Large flocks of House Sparrows.

10th November. S.E., light, fine, fog. Some Fieldfares, Blackbirds, Yellow-Hammers, Reed Buntings, and Chaffinches fairly numerous.

16th November. S., light, foggy. Still some Blackbirds and a few flocks of Lapwing; one Goldcrest at Marchchapel on sea-bank. Fieldfares coming in *continuously* all day until dark in parties of from two or three to fifty. They appeared tired and hungry, as many dropped in the fields close to the sea-bank and commenced feeding. Shot a female Pintail at Tetney at flight time.

Turdus pilaris. **Fieldfare.** ***Turdus iliacus.*** **Redwing.** 22nd December. Before and after this date I noticed extraordinary numbers of both these at Great Cotes—flocks frequently passing over at a great height. Our large old hedge-rows swarmed with them, the attraction being the heavy crop of haws, which were quickly eaten. 6th January 1899. Still very numerous both on arable and grass lands in the marshes.

Cygnus musicus Bechstein. **Whooper.** 18th Dec. Four, two old and two young, seen near Easington, and subsequently a 'herd' of thirty-two off the coast there. Immense flights of Duck also came into the river about this time.

One of the light-keepers at the Spurn, Mr. W. J. Counter, a most excellent observer, sends notes of the remarkable immigration there between 7th November and 22nd December.

7th November. S,O.4. About one hundred birds, chiefly small, flying around the light.

10th November. A large flock of Knot to the South.

12th November. S,O.M.D. Starlings, Redwings, Knot, Lapwing, Larks flying round light and some striking.

13th November. The same as on the 12th, including a few Sanderlings and one Gull.

15th November. Several Blackbirds and Starlings.

16th November. A large number of birds numbering several hundreds flying around the light, and a great number striking. Knot predominated and also Starlings. The various birds striking and observed were as follows, viz.:—Grey, Golden, Green, and Plover Knot, Woodcock, Oystercatchers, Curlews, Gulls, Larks, Fieldfares, Redwings, Stints, Sanderlings, Blackbirds, Snipe, also two Stormy Petrel.

17th November. Repetition of the 16th, but not striking the light so much. Three more Petrel killed. About five hundred birds were killed and captured these two nights. The wind being from the Southward and Westward, very dark and at times very thick.

19th November. Flock of Redcaps [Goldfinch] observed amongst the dunes.

20th November. A few birds flying round light, Sanderlings, Blackbirds, and Redwings. SW,O. and very dark.

23rd November, a.m. Two Lapwings struck the lantern heavily, and were dashed to pieces.

24th November. Two Woodcock shot on dunes, and one Snipe against lantern.

11th December. Flock of Snow Buntings flying about [This is the first notice I have of Snow Buntings in the present season.—J. C.]. Since this very numerous.

12th December, 3 a.m. WSW,O. Blackbird struck lantern and killed.

13th December, 9.30 p.m. Lark.

14th December. Several Crows to South.

15th December. Very large flock of Knot to South. Starling and Snipe killed at lantern.

17th December. Several Starlings, Larks, and Snow Buntings around the light.

19th December. A large number of Crows to South.

22nd December. A few Crows to South.

Plectrophenax nivalis (L.). **Snow Bunting.** 6th Jan. 1899. A few on the unploughed stubbles and grass lands, but are altogether in much less numbers than in other years.

Linota linaria (L.). **Mealy Redpoll.** 30th December. Two shot at Skeffling, Holderness, and taken to Mr. Loten.

Larus minutus Pall. **Little Gull.** One in the immature dress was shot in the early autumn on the coast near Grimsby. This is the only example I have seen during the season.

Mr. Thomas O. Hall sends the following notes from the Flamborough Lighthouse :—

'On Sunday, 14th August, at noon, I saw the first Rooks, about thirty, but no more till 12th October, when the immigration commenced and continued till the end of the first week in December. The first Goldcrests came on 21st October, and they continued for at least five weeks, but in a straggling manner. At the same time, I have never seen so many since I left the Farne Islands. On 25th and 26th October there was a flight of Golden Plover. Redwings and Fieldfare on two nights, but not in any quantity; still, more than for the last three years.'

Columba palumbus Linn. **Ringdove.** 11th-12th December (night of gale). Mr. Haigh writes :—"Great many came in, shot twenty in an hour, and young Peregrine in error as the light was so bad."

LAKELAND BIRD-NAMES.

Miss MARY L. ARMITT,
Ambleside, Westmorland.

Local bird-names—especially such as are dying out—are only slowly acquired by the stranger, and the few following are all I have met with that belong properly to Lakeland:—

Redstart. 'Jennie Redtail.'

Fieldfare. 'Feldfar' or 'Fieldfaw.' Redwing. 'Redbreast.'

Wren. 'Chittie,' also (less known) 'Chittaway Wren.'

Willow-Warbler. 'Miller-thumb.' Nightjar. 'Night-hawk.'

Whitethroat. 'Peggy Whitethroat.' Magpie. 'Pyat.'

Starling. 'Shepster.' Lapwing. 'Tewit.'

Woodpigeon. 'Cushat.' Chaffinch. 'Spink.'

Long-tailed Titmouse. 'Long-tailed Chittering,' 'Magpie.'

Swift. 'Deviling'—pronounced 'Dievilin.'

Tree-Creeper. 'Woodpecker.'

Dipper. 'Bessie Douker.' This is universal, and no other name is known.

Grey Wagtail. 'Wattery Wagtail.' Applied only to the wagtail 'about the becks.'

Ring-Ouzel. 'Craigie-easlin.' Probably a native pronunciation of Crag-Ouzel.

There is also the 'Crag-hawk,' apparently the Kestrel.

There are also two peculiar local names, known now to few—'Strawsmar,' pronounced 'Strēāsmer,' which, from the description given by a farmer from Grizedale, in Lancashire, appears to apply to the Garden-Warbler; and 'Scobbie,' for the Chaffinch. This latter name, furnished me by a friend, was confirmed by a very old woman, who spoke of it having been in general use in Cumberland when she was a child. It is known also in Wray, by Windermere, I am told.

Besides the Titlark and the Skylark, there is a bird called the 'Ground Lark,' of uncertain definition. I fear it is not the Tree Pipit, though it would be satisfactory to prove it so, and to know that a bird so abundant on the fell-slopes, and so generous of its beautiful strains, has not been left unrecognised and unnamed by the people.

The Goldfinch, once much more numerous than now, has a name, 'Pear-tree Flinch,' from the Pear tree, like the Sycamore, being a favourite nesting-tree with it.

I have found 'Stone-check,' pronounced 'Stēān-check,' applied to both Wheatear and Whinchat, though by different men.

PRESIDENTIAL ADDRESS
TO THE LINCOLNSHIRE NATURALISTS' UNION.

DELIVERED 9TH NOVEMBER 1897.

REV. CANON W. W. FOWLER, M.A., F.L.S., F.E.S.,

Lincoln.

ALTHOUGH as far as the number of members is concerned the Lincolnshire Naturalists' Union remains in almost the same position as last year, evidence is not wanting that the interest in the Union and in the natural history of the county generally is growing and spreading and is likely to lead to further important developments. One thing, however, becomes more and more plain, and that is, that if the Union is to be settled upon a firm basis it requires a resting place and a home for the results of its work, and for the results of the work of past and future generations of naturalists and antiquaries who have belonged to the county. In short, if Lincolnshire is to rank with other counties in scientific matters, as it is eminently fitted to do, a county museum, in the widest sense of the term, becomes an imperative necessity. Much has been already done, and much more perhaps may be done by utilising the rooms in Lincoln Castle, which have been kindly lent by the County Committee; but the rooms at present in use are rather regarded as store rooms than as an actual museum. There is no guarantee, people think, that things will be taken care of and preserved, and few therefore are willing to send valuable specimens which would come in in large quantities if a fitting museum were founded. The Union hoped much from the kindness of the late Mr. Ruston, who, as an honorary member of the Museum Committee, expressed himself as very favourable to the establishment of a museum, but his recent much-regretted death obliges us to wait until help comes from some other quarter. Meanwhile a most important matter has come to the front and calls for immediate action. Mrs. Cross, widow of the late Canon Cross, has offered her husband's transit and probably his equatorial telescopes, which are very valuable instruments, to the city of Lincoln on condition that a suitable observatory for their reception is provided by June 1899; it will surely be a disgrace to the county of Sir Isaac Newton if, through want of proper accommodation, these instruments are allowed to go to

a small town in the North of England which has already asked to have them, if they are not sent elsewhere.

During the past year (1897) there have been four excursions. The first of these was to Scotton Common, near Gainsborough, in June, its chief object being to allow members to view the large gullery on the Common; apart from the gulls, a large number of good birds (including the Sheldrake, Redshank, etc.) was observed, as well as many rare plants, and a very enjoyable day was spent, thanks to the arrangements made by Mr. F. M. Burton and others. On 1st August (Bank Holiday) a large party (including a contingent of 29 from Louth) met at Tetford and Holbeck, and on 26th August a very successful meeting was held at Wyberton Marsh, near Boston, for the purpose of investigating the foreshore of the Wash. In connection with these excursions the Rev. A. B. Skipworth and Mr. W. Lane-Claypon and the Rev. J. Conway Walter deserve the best thanks of the Union, the two former for their kind hospitality, and the latter for his services as guide to the Holbeck party. The fourth and last excursion took place on Thursday, 30th September, when a fungus foray was held in the woods of Linwood, admission to which was kindly allowed by Colonel Gordon; under the able guidance of Mr. Lewington a very large number of fungi were found, and no less than 54 were named by the Rev. W. Fowler, of Liversedge, who freely placed his extensive mycological knowledge at the service of the party.

Mr. Cordeaux has kindly supplied me with a few notes regarding rare birds which have appeared this year in Lincolnshire; and while speaking of birds it is pleasant to hear that the Nightingale has extended its range. The year before last it bred in Northumberland, and at Brackenborough, near Louth, a pair has brought off young for two years in succession. A pair or two usually breed in the suburbs of Lincoln each year. A pair of Grey Wagtails nested in the ivy of the house wall at Great Cotes and brought off a brood. Hitherto these birds have not been recorded as nesting in the eastern counties. On 24th May an example of Savi's Warbler was seen by Mr. Cordeaux in Great Cotes marshes. On 28th July, Mr. Cordeaux and Mr. Peacock heard the Great Reed Warbler calling from the reed bed in Madam's Creek, near Tetney. The loud notes of this bird had attracted the attention of men working in the vicinity, and subsequently the bird was seen. It remained in the neighbourhood for some weeks altogether.

Only about four previous occurrences are on record for Great Britain. On 18th September about seventy Pink-footed Geese passed over Brackenborough Hall from the sea towards the Wolds. This is the earliest arrival on record for Lincolnshire. About fourteen have been recorded in the 'Field' (2nd October, p. 537) as arriving on the Yorkshire Wolds on 9th September, which is the earliest record for Yorkshire.

A considerable amount of work has been done at the insects of the county by the Rev. A. Thornley and Mr. J. Eardley Mason. The former has a list in manuscript of no less than 900 species of Coleoptera recorded from the county, which will be a most valuable addition to our knowledge when published. No particularly rare species have been recorded with the exception of *Monochammus sartor* F., a large longicorn, found in a house in Lincoln. The records for Britain are few, but for my own part I believe that it is not indigenous, but is invariably imported in the larval state. Last year I commented on the rare appearance of the Large Heath Butterfly (*Epinephele tithonus*) in Lincolnshire, but I have since found that in certain localities it is not uncommon. I am very glad to know that the Diptera and Hemiptera are also receiving a share of attention from Mr. Thornley and Mr. Mason, as these orders are usually entirely neglected. Mr. Percy Grimshaw, of Edinburgh, is at present occupied with an important paper on the Lincolnshire and Nottinghamshire Diptera, the material for which has been supplied by Mr. Thornley.

I do not feel in any way competent to speak of the botany of the county, especially as we have two botanists in the Union, the Rev. E. Adrian Woodruffe-Peacock and the Rev. W. Fowler, who are second to none in their knowledge of British botany. Mr. Peacock, however, informs me that the following are the best species that have been found among the phanerogams:—*Thalictrum collinum* Wallr. from the Isle of Axholme, *Trifolium filiforme* L. from both North and South Lincolnshire, *Salix undulata* Ehr. from Great Cotes, and *Euphorbia portlandica* L. from Skegness. The latter has been growing at Skegness for years, but was first recorded this year by Mr. F. A. Lees.

In my last address I spoke at some length on the question of the importance of economic entomology, which cannot well be over-estimated in an agricultural county like Lincolnshire, and I alluded to the work of Mr. J. Eardley Mason. Mr. Mason, whom we are all very glad to see again working among us, has kindly furnished me with the following notes on insect pests

during the current year, which cannot fail to be interesting to all of us:—'From an inspection of a large number of fields north, south, and east of Lincoln in July and August, it appeared that wheat was almost free from the Hessian Fly (*Diplosis destructor* L.), but that Corn Aphis (*Siphonophora*) was prevalent, and the damage caused by its absorbing part of the sap on the way to the ears was shown by the dwarfing of the individual grains. The Wheat Midge (*Cecidomyia tritici* Kirby) was answerable for about an average amount of injury. Feeding within the glumes the maggots, where three or more are present, distort and shrivel the grain, and in some cases, where numerous, destroy it. The injury caused by these two pests is readily distinguished from the complete abortion of the grain due to non-fertilisation, of which there has been too much this year. This is probably due to a few frosty nights at flowering time. The Wheat Sawfly (*Cephus pygmæus* Curt.) was not noticed, and barley suffered very little from gout, the bulging unemerged ears, the work of the Ribbon-footed or Gout Corn Fly (*Chlorops tæniopus* Curt.) being very rarely seen. A few Hessian Flies made their appearance rather late, but practically no damage was done by this or the preceding species. Oats had about the usual number of side shoots occupied by the larva of *Oscinis frit* L. or an allied species. In spite of the dry weather nothing was noticed of the presence of the usual moth larvæ (*Mamestra, Agrotis*, etc.) in the young turnips just thickening for the bulb. This report is certainly an encouraging one, and bears out my opinion that the scares regarding these pests are, except so far as concerns the particular season, quite unjustifiable. The Hessian Fly, for instance, is always with us, and has probably never been introduced at all; it is only at times that it becomes very destructive, and apparently at long intervals; hence the scare about ten years ago when it was thought to be a new plague altogether and the last straw that would break the farmer's back. This irregularity of appearance in large numbers is common to many insects. In the case of harmless species like the Clouded Yellow Butterfly it simply rouses curiosity and admiration, but in the case of noxious insects it immediately causes a panic. Perhaps the worst of all these panics was the one created by the appearance of the Colorado Potato Beetle in America some twenty years ago; we have heard very little about it since, but when the favourable circumstances for its enormous multiplication again occur history will repeat itself.

Naturalist.

It is the privilege of a President in his address to wander somewhat from his special subject and to be allowed a certain license of generalisation, if I may so call it, and such a privilege is certainly a good thing for his hearers, for a man is too apt to think that his hearers know as much of his special subject as he himself does, and to burden them, as I have been often burdened myself, with the 'sesquipedalia verba' of a technicality that is meaningless to the uninitiated. I would therefore say a few words on a subject which is often being brought to the front, and that is the question of mere collecting as compared with observation and research; as a rule, the 'mere' collector is held up to contempt and reprobation, but unless he is wantonly destructive, there is very much to be said for him; in the first place he gets an infinite amount of harmless enjoyment; there is no pleasure greater than that of a keen collector who steals a half or a whole day to visit some historical locality which he has not explored before, and who finds his expectations more than realised, unless it be that of a collector who unexpectedly strikes a new locality for himself, and comes away with his box, bottle, or vasculum filled with good species which he knows will be a delight for some time to come to himself and his friends. I say to 'his friends' advisedly, for the collector who will not share his treasures nor part with them except on the rule of a strict quid pro quo, and who, moreover, is always keeping his localities a dead secret (except strictly in the interests of science to prevent extermination) is no true naturalist but only a mere huckster; we are told that it is 'by mutual confidence and mutual aid' that 'great deeds are done and great discoveries made,' and nowhere is this more true than in the field of Natural History: the field is a vast one and only a small corner can be explored by one individual, but it is a field in which the very humblest may do good work, and where the greatest workers are necessarily dependent on the most obscure; observers, systematists, and generalisers owe a very great debt, as Darwin himself would have been the first to allow, to individual collectors over limited areas, through whom many of the most important facts on which they frame their inductions, have over and over again been brought to light. At the same time to rest as a mere collector, to collect for the sake of filling vacant spaces in one's cabinet, to spend all one's time in the manipulation of specimens in order that they may present a regular and uniform appearance is a thing greatly to be deprecated; it is much the same with these as with certain

microscopists I have come across who spent all their energies in finding out how to work with higher objectives than their friends, and who are perfectly happy and contented if they have resolved out a few lines on a diatom which a friend's microscope obstinately refuses to reveal; of course, a collector in the strictest sense of the term must to a certain extent be an observer: he must observe localities and habitats and seasons of capture if nothing else, and if he will only keep a record of these he will have done much; but even this is often neglected, and therefore I would put in a strong plea for more observation and more keeping of accurate records of all kinds. Gilbert White's work was not of a very solid or wide description, but he observed such facts as were within his reach intelligently and accurately, and recorded them intelligibly and pleasantly, and so earned for himself a reputation that appears to increase rather than diminish as time goes on. Now observations of any kind are most valuable, but as in simple collecting one group must be particularly attended to, so it is the same with regard to observations; some may work at life histories, a most interesting and much neglected study, others at structure, others at distribution, including migration, while others again content themselves with classification; there is, however, one subject, or rather group of subjects, which I think has a particular charm for the ordinary observer, and that is the question of protection and mimicry in nature, and the allied questions of warning colours, recognition markings, and other correlated matters; there are some people who think that the observers in these branches go too far and see too much; but granting this to a certain extent, yet the main facts carry conviction to anyone who can put two and two together. Take for instance a branch on which a large number of the caterpillars of the Geometridæ are feeding; an uninitiated observer would probably not see one, even if he looked closely, so exact is their resemblance to the small twigs of the tree on which they are resting: and then observe a hawthorn hedge covered with the scarlet black and white caterpillars of the Gold Tip Moth (*Porthesia similis* Fuess.) flaunting themselves in the sun. What is the reason of the difference? Evidently that one is edible and needs protection, and that the other is distasteful and requires to be made as conspicuous as possible in order to avoid accidental injury by would-be devourers. Many of our British moths are closely protected by their likeness to the rocks or tree trunks on which they rest; some have protective upper wings

but very brightly-coloured under wings, as their names Scarlet Underwings or Yellow Underwings imply. I have watched the large Scarlet Underwing (*Catocala nupta* L.) flying among willows on the banks of a stream, a flash of scarlet followed by a total disappearance, so exactly do the upper wings resemble the trunk on which it settles. What, however, is the reason of the brilliant scarlet? Probably, as Professor Poulton, who has studied the subject very thoroughly, writes to me, its use is to draw the attention of an enemy to a non-vital part. This appears to be proved by the frequent chipping of the wings at their margins; the bird makes a dash at the most attractive portion of the insect which, in any case, is very conspicuous on the wing, and so it escapes, and when once it reaches its tree becomes practically invisible; the same is the case to a great extent with the Yellow Underwings, but they, as well as the Herald Moth (*Gonoptera libatrix* L.) and the Centre Barred Sallow (*Cirrhædia xerampelina* L.) and its allies, are also protected by their close resemblance to dead leaves; others, again, like the Buff-tip (*Phalera bucephala* L.) and the Sharks (*Cucullia*) when at rest are just like broken pieces of wood or splinters, while others again, e.g., *Abraxas sylvata* Scop., closely resemble the droppings of birds from a height on to leaves; and so we may carry the question through the whole animal kingdom, remembering that environment must always be taken into account. The Tiger in the open is a most conspicuous object, but amid the dry jungle it is so exactly adapted to its surroundings that it is scarcely visible to a novice at a comparatively short distance, even though clearly in sight to an expert; and as we thus observe we are carried on to further fields. What animals are better protected by colour than the Rabbit and the Hare? Why then has the Rabbit a conspicuous white tail and the Hare black ears? In the Rabbit it is plainly a recognition marking for the young ones to follow and so be guided to safety, and it is probably much the same with the black ears of the Hare, although in this case it is not so obvious.

We have alluded to warning colours, and we find as a rule that brightly-coloured larvæ or reptiles are distasteful to birds, lizards, etc. This distastefulness is often heightened by external hairs, unpleasant secretions, and warning attitudes. In the Hop Dog, the caterpillar of the Pale Tussock Moth (*Dasychira pudibunda* L.), and in some of the Vapourer Moths and their allies, the back is furnished with several hairy tussocks or little

humps of hairs which easily come out. They are the parts first seized by an enemy, and the unpleasant mouthful is usually sufficient to prevent a second attempt. The Squirrel's bushy tail is probably on much the same principle. An enemy in pursuit would most likely make a grab at the large tail and get simply a mouthful of hair for its pains.

If we pursue the subject further we get to variable protection, a most interesting branch of the subject, and to the great question of mimicry. The latter differs from protective resemblance by the fact that it deals with the imitation of living things, whereas protective resemblance is confined, strictly speaking, to a likeness to inanimate objects. The best instances of mimicry are found in tropical countries, but in our own country we have the Clear-wing Moths closely resembling Wasps and Hornets, and so being protected; and the Hawk-like appearance of the Common Cuckoo must have struck most of us.

There is, in fact, no limit to this most fascinating field of observation. Often we may make mistakes, but these very mistakes lead to corrections and open up new side-paths of knowledge. Nor must we, in the end, forget the important bearing that even the least of these facts has upon the great question of natural selection and of evolution generally. Our ideas regarding these have been considerably modified of late years. The term evolution has been applied to so many sciences, not to speak of ethics and theology, and in so many connotations, that it has almost ceased to have any definite meaning and has become too often a mere catch-word. At the same time there are vast truths underlying it. We must indeed allow that the old system of teleology or final causes was to a great extent done away with by the theory of natural selection, but no one can for long be an observer in the field we have been indicating without feeling convinced that this theory simply shifted the point of view and opened up to us teleology of a far greater and deeper character. I am afraid that I have considerably digressed from county natural history, but I hope that you will forgive me, and, in conclusion, I should like to say that, since I wrote the greater part of my address, a new society has been formed in Lincoln under the title of the Lincoln Scientific Society, which we hope may grow into a County Association, and, as a sectional society for home work and the reading of papers, supplement the excellent field work of the Lincolnshire Naturalists' Union.

EXTRACTS FROM A CONCHOLOGIST'S NOTEBOOK.

WILLIAM NELSON, M.C.S.,

Crossgates, Leeds; Hon. Sec., Leeds Conchological Club.

3.—TO WISTOW AND CAWOOD FOR *LIMNÆA GLABRA*.

At the beginning of 1887, having been told by my friend, Mr. J. W. Taylor, of a locality at Bishop Wood for this local species where he had obtained several years before, I determined on an examination of the district to search for it, and during the first week in May I started for Bishop Wood, viâ Hambleton. I stayed a little time to examine the broad stream or dyke and obtained specimens of *Sphærium corneum*, *Bythinia tentaculata*, *Valvata piscinalis*, *Planorbis albus*, *P. vortex*, *P. carinatus*, *P. umbilicatus*, *Physa fontinalis*, *Limnæa peregra* and *L. truncatula*. Having left here and gone towards the wood, I could not but notice the daisy-spreckled banks, and here I saw my first butterfly of the season, a hybernated specimen of the Small Tortoiseshell (*Vanessa urticæ*). In a ditch here I found a few specimens of *Physa hypnorum*, *Planorbis spirorbis*, and *Limnæa truncatula*, but I searched in vain for a pond where, about 1859, I was wont to get specimens of the Water Violet (*Hottonia palustris*) for my aquarium; I suppose since that time it has been filled up. I again joined the path, and in a drain near obtained *Limnæa peregra* and *L. truncatula*, both rather large. The former were very fragile and, though I brought a good many away, I scarcely got a perfect example home. In a pond near to the farm I obtained additional examples of *Physa hypnorum*, *Planorbis spirorbis*, *Limnæa peregra*, and *L. truncatula*. Having passed through the farmyard, the road skirts the wood, which at the time was bright with Primroses (*Primula vulgaris*), and here again I saw some butterflies flitting about, and which from their size and manner of flight, I concluded were the Small White (*Pieris rapæ*). I then turned into the road that runs through the wood to examine the ditch on each side of the road, but I failed to find any shells. I spent considerable time at this place, because I understood it was here where Mr. Taylor found the species I was in search of. I left very reluctantly, and gave up all hope of finding my favourite species of *Limnæa*. I then retraced my steps into the road again, and proceeded till I came to a ditch near Scalm Park.

Here I found *Physa hypnorum*, *Planorbis spirorbis*, *Limnæa peregra*, and *L. palustris*. Proceeding further along the road, I came to a number of small ponds, which are situated close to the cross roads here. The first pond I searched yielded no molluscs; the next one I examined had an abundance of *Planorbis spirorbis* and *Limnæa palustris*, the latter being very small examples. After a time, in another part of the same pond I began to find *Physa hypnorum*, and at length was rewarded by a specimen of *Limnæa glabra*, and after a diligent search I obtained two or three additional examples. I then left this pond and tried another, which yielded a goodly number of *Limnæa glabra* and *L. truncatula*. I may here remark that the *L. glabra* were small and slender, and many of them were possessed of a thickened rib just within the aperture of the shell. These ponds and part of the ground round seem to me, from some of the plants which still survive, to have been a common until a comparatively recent time.

Having reached a small stream that crosses the road near Wistow, I examined it, but only found *Limnæa peregra*. Passing through the village of Wistow, I turned towards Cawood, and in a ditch near the latter village I found *Physa hypnorum*, *Planorbis spirorbis*, and *Limnæa glabra*, the latter being of a different form altogether from those gathered at the cross roads between Wistow and Scalm Park, being longer and proportionately broader.

Having passed the village maypole, I went alongside a dried-up canal in front of the castle and noticed skeletons of Eels (*Anguilla* sp.) lying on the soft mud. Arriving at Bishopdyke, I turned to the left and had for some miles a very unpleasant walk. The dyke was undergoing the process of being deepened and widened; the mud which formed was piled up on the roadside which runs alongside the dyke; this gave off an unsavoury smell, but amongst the drying mud I obtained well-preserved specimens of *Limnæa peregra*, *L. auricularia*, *L. stagnalis*, *L. palustris*, *Planorbis carinatus*, and *P. corneus*, which, from their long burial in the mud had acquired quite a sub-fossilised appearance.

I should like here to remark that I have not met with recent specimens of *Limnæa auricularia*, and should be pleased to hear if any readers have so obtained it. Having passed Biggin, which laid to the right, I turned to the left and searched some ponds, which had evidently at one time been a moat, at a place called Manor Garth. Here I got examples of *Planorbis*

spirorbis, *P. umbilicatus*, *Limnæa peregra*, and *L. palustris*. One of the latter had the body whorl ornamented by white bands due to an absence of epidermis, evidently caused by some injury sustained by the mantle. Crossing a number of fields, I searched the railway line and walked alongside it to the station, where I found I should have to wait some time for a train; so I partly retraced my steps and went into Gascoigne Wood, where I noticed many Primroses and also some unusually gaudily-coloured flowers of *Anemone nemorosa* and *Oxalis acetosella*. I left here in time to get the train and arrived home at about half-past eight well tired. The day was a most pleasant one, the sun shining brilliantly, in fact a perfect summer's day. In addition to this, I had been successful beyond my most sanguine expectations. To find two fresh habitats in one day for *Limnæa glabra* is a feat that is not very often accomplished.

[Read before the Leeds Conchological Club, 10th December 1898.]

BOOK NOTICES.

We lately received the ninth edition of '**Skertchly's Geology,**' by **James Monckman,** D.Sc. Lond. It is a small 8vo. volume in cloth, and forms one of Murby's Science and Art Department series of Text-Books.

From the Royal Society for the Prevention of Cruelty to Animals we have received a reprint, very large quarto, of a paper on '**The Wanton Mutilation of Animals,**' by **George Fleming,** C.B., etc., in which ear and tail cropping in dogs, ear-cropping and slitting and tail-docking in horses, are unsparingly condemned, and shown to be not merely cruel, but unnecessary. There are numerous illustrations of horses showing the evil and unsightly effects of these practices.

From Canon **A. M. Norman** we have received a further instalment of his '**Museum Normanianum,**' under which title he publishes a catalogue of the invertebrata of Europe and the Aretic and North Atlantic Oceans which are contained in his splendid collections. The present instalment includes No. 9, Tunicata; 10, Sternaspis, Gephyrea, and Phoronis; 11, Annelida polychæta, and 12, Cœlenterata. We have only recently received it, though it bears date at the end of the preface 18th November 1897.

An interesting little book now lying before us is one by **Edith Carrington,** entitled '**The Farmer and the Birds,**' which has a preface by Canon Tristram. The book is published by Messrs. George Bell & Sons, for the Humanitarian League. It is an admirable little book and quite a storehouse of detailed facts bearing upon the value of our feathered friends to the farmer. Not only is the book full of interest and of value, but there is a commendable absence of vague wordiness and of mere sentimentality. The grouping of the birds is of workers overhead, workers on the ground, summer workers, workers all the year, and slandered workers, while a brief and succinct analysis of the Law about Birds closes the little volume.

FOOD AS INFLUENCING VARIATION IN HELICES.

JOHN HAWKINS,
York.

For the past four seasons I have made a few notes respecting the forms and colours of Snails feeding on various plants.

I find that the Black Horehound (*Ballota nigra*) generally produces the *Helix nemoralis* and *H. hortensis* of a very dark brown or nearly black.

The *Epilobium hirsutum* or Great Willow-Herb produces the same shells very large and of a beautiful yellow colour.

I have always found the best examples of var. *lilacina* feeding on the Ground Ivy (*Nepeta glechoma*), while Jack-by-the-Hedge (*Sisymbrium alliaria*) nearly always produces very fine var. *rubella*.

The Common Blackthorn (*Prunus spinosa*) seems to be the favourite food-plant for the var. *castanea* of *H. hortensis*, and the same may be said of var. *hyalozonata* and the *Pastinaca sativa*.

The Common Nettle (*Urtica* sp.) supplies most of the five-banded varieties, and on the Coltsfoot or Cleat (*Tussilago farfara*) I found 32 white examples out of 46 *H. nemoralis*.

The Ash (*Fraxinus excelsior*) supplies food for *H. nemoralis* and *H. hortensis*, which are principally of pale colours.

When at Castle Howard last summer I noticed a large bed of Knapweed (*Centaurea nigra*) which had nearly all its foliage eaten off by a white variety of *Helix virgata*, and a short distance off the same Snail was feeding on the Plantage, and were nearly all very darkly banded.

I also found that the *Helix aspersa* fed on the Burdock (*Arctium lappa*) are much lighter in colour than those fed on the *Heracleum spondylium*, while some which feed on the Common Ivy (*Hedera helix*) are quite a bright red colour.

The Common Vetch (*Vicia sativa*) seems to produce the minor varieties. I have seldom found *H. hortensis* on this plant larger than *H. virgata*.

NOTE—ORTHOPTERA.

***Periplaneta australasiæ* at Halifax.**—Several months ago, Mr. S. L. Mosley showed me some specimens of this fine Cockroach which had been sent to him by Mr. E. Halliday, and had been found in considerable numbers in a greenhouse at Shibden, Halifax. It is only a few years since the species was first noticed in Britain, and like our other representatives of the genus, introduced through importation, but it seems to be rapidly spreading over the country, though this, I believe, is its first observed occurrence in the north.—GEO. T. PORRITT, Crosland Hall, Huddersfield, 18th Jan. 1899.

DIATOMS OBSERVED AT HATFIELD WEST MOOR, NEAR DONCASTER.

J. NEWTON COOMBE,

Sheffield.

WITH LIST OF SPECIES FOUND.

J. NEWTON COOMBE AND M. H. STILES.

If the members of the various sections represented at the Yorkshire Naturalists' Union Doncaster excursion, in May last, had been able to prolong their explorations on that occasion to the extent to which my microscope and an oil lamp permitted me to continue my examination of the minute plant life of the ponds and ditches in the neighbourhood, I do not doubt but that many of them would have been rewarded, as I was, by results which the labours of a single day, however patient and persevering, could not possibly have brought to light. Although the list of the Diatomaceæ published in the programme as having being found in the West Moor waters was, thanks to Mr. Stiles' researches, by no means a meagre one, I was pleased to be able to confirm his belief that it was far from exhausting the number of species of these fascinating shell plants which flourish there. I give below the names of Diatoms which I was able to identify as occurring at least twice in the samples which I examined from about a dozen tubes.

These gatherings consisted chiefly of flocculent matter which the sun's rays, liberating the oxygen of the Diatoms inhabiting it, had caused to rise from the bottoms of the ditches to the surface of the water, forming that well-known yellowish-brown scum so pleasing to the eyes of the diatomists. Decaying portions of *Myriophyllum* also furnished good material for the habitat of several of the more common species. The letters 'C,' 'F,' and 'R' placed after each species indicate that it was 'common,' 'frequent' or 'rare' in the gathering, as the case might be.

The most interesting features in my 'find' were (1) the number of filaments of *Melosira varians* containing megafrustules newly formed from the diminutive parent frustule to which they were attached, (2) the numerous instances of conjugation taking place among *Cymbella cistula* Hempr. (NOTE—That, contrary to the opinion of Dr. Miquel and other diatomists, conjugation does actually occur in the case of this species, is proved by

photomicrographs I have taken from other gatherings showing the emerging and intermingling of the protoplasmic contents of the frustules as they lie concave side to concave side prior to the formation of the megafrustules which result from the process), and (3) the frequent occurrence of long crooked frustules of *Synedra*, evidently newly born and requiring a series of sub-divisions to enable them to regain the symmetry of the parent frustule. (NOTE.—Prolonged and repeated examinations of several so-called 'varieties' of species among the Diatoms have convinced me that in the plastic condition in which the megafrustules emerge from the valves of the parent frustules they are liable to become silicified in a mis-shapen condition and that, while undergoing the subsequent subdivision necessary to bring about the symmetrical form of the parent, they are frequently mistaken for new varieties.)

I may mention that one of the West Moor gatherings contained some interesting specimens of the well-known alga *Zygnema*, in conjugation, and that among the Desmids which were mixed with the Diatoms I came across *Closterium striolatum*, *C. lunula*, *C. setaceum* Ehrb., *Euastrum oblongum* and *Staurastrum dejectum*, the first named being the most common. Mr. Stiles also noticed *Closterium rostratum* and *Cosmarium pyramidatum*.

The following is a list of the Diatoms found in the neighbourhood of West Moor, Doncaster, by Messrs. J. N. Coombe and M. H. Stiles:—

Amphora ovalis Kutz. (R.).
Amphora ovalis var. pediculus Kutz. (C.).
Cymbella lanceolata Ehr. (F.).
Cymbella gastroides Kutz. (R.).
Cymbella cistula Hempr. (F.).
Cymbella cuspidata var. naviculiformis Auersw. (R.).
Encyonema cœspitosum Kutz. (R.).
Stauroneis phœnicenteron Ehr. (F.).
Stauroneis gracilis Ehr. (R.).
Stauroneis anceps Ehr. (R.).
Navicula viridis Kutz. (F.).
Navicula major Kutz. (R.).
Navicula oblonga Kutz. (F.).
Navicula amphisbœna Bory (R.).
Navicula cuspidata Kutz. (R.).
Navicula semen Ehr. (R.).
Navicula elliptica Kutz. (R.).
Navicula radiosa Kutz. (C.).
Navicula limosa Kutz. (F.).
Navicula limosa var. acuta (F.).
Navicula exilis Grun. (C.).
Navicula iridis Ehr. (R.).
Navicula peregrina Kutz. (R.).
Navicula serians Breb. (R.).
Navicula humilis Donk. (C.).
Navicula reinhardtii Grun. (C.).
Navicula latiuscula Kutz. (?).
Amphipleura pellucida Kutz. (F.).
Pleurosigma attenuatum W.Sm. (F.).
Pleurosigma spencerii W.Sm. (F.).
Gomphonema acuminatum Ehr. (F.).
Gomphonema constrictum Ehr. (F.).
Gomphonema intricatum Kutz. (F.).
Rhoicosphenia curvata Grun. (F.).
Achnanthes exilis Kutz. (F.).
Cocconeis placentula Ehr. (F.).
Cocconeis pediculus Ehr. (F.).
Epithemia turgida Kutz. (R.).

Epithemia sorex Kutz. (R.).
Epithemia gibba Kutz. (R.).
Epithemia zebra Ehr. (R.).
Eunotia lunaris Grun. (R.).
Eunotia pectinalis var. ventricosa Grun. (R.).
Eunotia gracilis Rab. (F.).
Eunotia arcus var. minor Ehr. (R.).
Synedra radians Grun. (C.).
Synedra ulna Ehr. (F.).
Synedra ulna Ehr. v. subæqualis (R.).
Synedra capitata Ehr. (C.).
Fragilaria capucina Desmaz. (C.).
Meridion circulare Ag. (R.).
Denticula tenuis Kutz. (F.).
Tabellaria flocculosa Roth. (F.).
Surirella ovalis Breb. (R.).
Nitzschia linearis W.Sm. (F.).
Nitzschia dubia W.Sm. (R.).
Nitzschia sigmoidea Ehr. (C.).
Nitzschia fasciculata Grun. (R.).
Nitzschia acicularis W.Sm. (R.).
Melosira varians Ag. (C.).
Cyclotella kutzingiana Chauvin (F.).
Cmatopleura elliptica W.Sm. (R.).
Cymatopleura solea W.Sm. (F.).
Diatoma elongatum Ag. (C.).
Colletonema lacustre Ag. (R.).

NOTE—TRICHOPTERA.

***Halesus guttatipennis* in Derbyshire.**—On 19th October last, Mr. S. L. Mosley took several specimens of this species at Lathkildale, near Bakewell. The only other British localities known for the insect are Pickering in Yorkshire, and Alford in Lincolnshire.—GEO. T. PORRITT, Crosland Hall, Huddersfield, 14th January 1899.

NOTE—LEPIDOPTERA.

***Ephestea kühniella* in Yorkshire.**—The Rev. Cyril D. Ash informs me he took a specimen of this species at Skipwith in November last. The species has not previously been recorded for Yorkshire, though several years ago outside Doncaster railway station, I saw, but did not secure, a specimen which I then, and have ever since, fancied was this species.—GEO. T. PORRITT, 14th January 1899.

NOTE—ORNITHOLOGY.

Magpies as Foster-Parents of Game-Fowl: a Query.—Can any reader, whose memory goes back to the time when cock-fighting was a popular sport, say whether it was a common custom for breeders of game-fowls to place eggs in Magpies' nests? A few months ago I heard of a farmer at Handforth, in East Cheshire, who used to do so, in the belief that chickens incubated by Magpies would develop fighting qualities above the average. My informant can recollect climbing to a Magpie's nest for this farmer, in order to bring down some chickens whose birth was proclaimed by their plaintive chirping. This would be some fifty or sixty years ago, when the Magpie was perhaps even more plentiful in East Cheshire than it is now. To students of folk-lore it would be interesting to know whether the practice of substituting game-fowls' eggs for those of the Magpie (*Pica pica*) was a general one, or merely the caprice of a single breeder.—CHAS. OLDHAM, Alderley Edge, 30th January 1899.

NOTES AND NEWS.

The death of Prof. Henry Alleyne Nicholson is announced. He was a Cumbrian by birth, born at Penrith, in 1844, and was the son of a distinguished philologist. His work and career as a Professor, at Edinburgh, at Toronto, at Durham, at St. Andrews, and finally at Aberdeen, are well known. So also are his palæontological, geological, and zoological researches, and the various text-books and memoirs which bear his name on their title-pages. He was Doctor both in medicine, in science and in philosophy, and in 1897 was elected to the Fellowship of the Royal Society. As a palæontologist his name is preserved by the dedication of *Hillestroma nicholsoni* in his honour.

HULL NATURAL HISTORY.

Transactions | of the | Hull Scientific & Field Naturalists' Club | For the year 1898. | Vol. I. No. 1. | Price One Shilling. | (Free to Members). | Hull: | William Andrews & Co., The Hull Press. | — | December 14th, 1898.

The Hull Naturalists are to be congratulated on the appearance of this their first publication. More especially are they to be congratulated on their clear-sighted recognition of the fact that the function of a local society when publishing is to deal with local matters, and local matters only. Every paper in this part is one of original research, a useful contribution to our local knowledge. The first is by Mr. Thomas Bunker on 'The Natural History of Goole Moor and its immediate vicinity,' particularly valuable, partly from Mr. Bunker's long and intimate acquaintance with his own neighbourhood, and partly because the moor is fast losing its pristine character. The next paper is by Mr. H. M. Foster on 'The Fishes of the River Hull,' which are treated of very fully and with great wealth of anecdote. Mr. Thomas Sheppard, the energetic Secretary of the Society, follows with 'Notes on a large pair of Antlers of the Red Deer (*Cervus elaphus*) from the peat at Hornsea,' with an excellent full-page illustration. Some brief notes on the Society's programme and work for the past year follow, and there are short notes on 'Pond Herrings' (H. M Foster), on 'Odontidium harrisonii' (R. H. Philip), and on 'Local Entomology, 1898' (J. W. Boult), all of interest. A list of members of the Society is given. The Society and Editor are to be congratulated on stating the exact date of publication, and we wish them all possible prosperity in the future.

NOTES—MAMMALIA.

Otter in Lincolnshire.—A bitch Otter (*Lutra lutra*), weighing 17 lbs., and measuring 4 feet 2 inches in length, was shot on January 27th, 1899, at Willingham, Market Rasen, N. Div. 7. - W. Lewington, King Street, Market Rasen, 30th January 1899.

Squirrels and Fungi (Ante, p. 340). -It may be of interest in this matter to recall what the late Mr. Tom Duckworth (of Carlisle) told Mr. Macpherson, that in his experience the fungi most affected by squirrels were *Amanita rubescens*, the red fleshed, and *Russula heterophila*, the variable mushroom. See Macpherson's 'Fauna of Lakeland,' 1892, p. 78, note.—S. L. Petty, Ulverston, 2nd Nov. 1898.

Dormouse in Lake-Lancashire. 'The Dormouse [*Myoxus avellanarius*] occurs sporadically in a few of the most densely planted portions of Lakeland, from Rusland Valley up to the slopes of the Fells at the southern end of Windermere.' See Macpherson's 'Fauna of Lakeland,' 1892, p. 78. This is quite correct to date, the animal being caught by the woodcutters. - S. L. Petty, Ulverston, 2nd Nov. 1898.

CHEMICAL NOTES ON LAKE DISTRICT ROCKS.

I.—THE ORDOVICIAN VOLCANIC SERIES.

ALFRED HARKER, M.A., F.G.S.,

St. John's College, Cambridge.

Some years ago, being then engaged with my friend, Mr. J. E. Marr, upon the geological structure of the English Lake District, I began a petrographical study of the lavas and tuffs of the Ordovician volcanic series, or 'Borrowdale Series,' which constitutes the greater part of the ground in that area. My unfinished notes consist chiefly of descriptions based on a large suite of microscopical sections, and these could not with advantage be published. There are also, however, a number of determinations of silica-percentages, kindly made for us by chemical friends, and of specific gravities, taken with the hydrostatic balance by the present writer. These it is desirable to make public for the benefit of other geologists who may be occupied with the district in question. Further, it may be useful to bring together references to the chemical data scattered through various papers already published, whether belonging to the volcanic series or to other rocks in the district, and these references are accordingly collected below. Complete analyses are not quoted, but their silica-percentages are given as the readiest means of identifying the analyses referred to.

The present instalment deals with the Ordovician volcanic series only, and the remaining rocks will be treated in a second part. Those portions of the Eden valley and Teesdale and of the Sedbergh and Ingleton districts which consist of Lower Palæozoic rocks, are included with the Lake District as being in a geological sense appendices thereto.

The late Mr. Clifton Ward published several complete analyses by Mr. J. Hughes, of which the silica-percentages are here reproduced.* Ward considered the intermediate group (andesites) to be the prevalent lavas of the district, and a like assertion has been made by myself in 'The Naturalist' for 1891 (p. 146); but Mr. Marr and I have since found that it is the basic group that has the widest distribution. There is little doubt that some of Ward's 'altered ashes' are in reality lavas,

*The first five from Quart. Journ. Geol. Soc., vol. xxxi., pp. 408, 411, 597, 1875; also in 'The Geology of the Northern Part of the English Lake District' (Mem. Geol. Surv.), pp. 16, 18, 28, 1876. The next three from Monthly Micro. Journ., vol. xvii., p. 246, 1877.

but this remark does not, I think, apply to the two here mentioned.

(1). 60·718. Brown Knotts, near Keswick: pyroxene-andesite; No. 6 of Ward's typical section, the basement flow of a very thick series.

(2). 59·511. Iron Crag: pyroxene-andesite; No. 12 of same section.

(3). 69·673. Base Brown, near Borrowdale: 'altered ash.'

(4). 68·421. Slight Side, near Eskdale: 'highly altered coarse ash' (breccia).

(5). 59·151. Lingmell Beck, Wastdale: 'altered contemporaneous trap' (andesite).

(6). 53·300. Eycott Hill: hypersthene-basalt; No. 12 of Eycott section, microporphyritic.

(7). 52·600. Eycott Hill: hypersthene-basalt; No. 13 of Eycott section, very compact.

(8). 51·100. Eycott Hill: hypersthene-basalt; No. 15 of Eycott section.

For comparison with the last three we have a silica-percentage by Mr. T. Cooksey, published by Prof. Bonney.*

(9). 53·40 and 52·73 (mean 53·06). Eycott Hill: hypersthene-basalt; No. 4 of section, with large porphyritic felspars; sp.gr. 2·754.

The analyses given by Mr. J. D. Kendall† of lava and ash-rock of the Borrowdale series are not new analyses but averages deduced from the above, viz., from (1) and (2) and from (3) and (4), respectively. Mr. P. F. Kendall,‡ in describing a large boulder found at Manchester, and probably derived from the Lake District, gives an analysis of it by Dr. J. B. Cohen, and for comparison one of a rock from 'near Coniston,' the locality no. being more closely specified. The silica-percentages are:—

(10). 63·60. Boulder, Oxford Street, Manchester: andesite; sp.gr. 2·74.

(11). 65·80. Near Coniston: ? andesite.

We may add, as probably another Lake District rock, a 'felspathic trap' boulder at Manfield analysed by Mr. W. F. K. Stock.§

(12). 59·87. Greystone boulder, Manfield, near Darlington: andesite, sp.gr. 2·66.

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* Geol. Mag. for 1885, p. 80.

† Trans. Manch. Geol. Soc., vol. xvii., p. 294, 1884.

‡ Ibid, vol. xx., p. 145, 1889.

§ Naturalist for 1889, p. 304.

The following five silica-percentages were published in two papers on the Shap granite by Mr. Marr and the present writer.* Of (14) and (15) partial analyses were given; of (13), (16), and (17) only the silica and lime. The work is Mr. E. J. Garwood's.

(13). 59·95. Between Wasdale Pike and Great Yarlside: amygdaloidal andesite; sp.gr. 2·736.
(14). 75·95. Stockdale: spherulitic rhyolite; sp.gr. 2·608.
(15). 76·95. Wasdale Head Farm, close to Shap granite: nodular rhyolite, metamorphosed; sp.gr. 2·623.
(16). 50·75. Low Fell, Shap: basalt, partly metamorphosed; sp.gr. 2·800.
(17). 50·90. Low Fell, Shap: basic tuff.

The next six silica-percentages are given by Mr. W. M. Hutchings in his Petrological Notes on some Lake District Rocks,† and No. (24) is from a complete analysis by Dr. Cohen, quoted in the same paper. Three other rocks examined by Mr. Hutchings are excluded, since it appears from his descriptions that they belong to intrusions, not to the volcanic series.

(18). 51·35. Scarf Gap, near summit of pass: vesicular basalt with porphyritic augite; sp.gr. 2·82.
(19). 57·55. Above Nan Bield: augite-andesite; sp.gr. 2·65.
(20). 52·45. Easedale Tarn, right side: much altered andesite.
(21). 60·75. Easedale Tarn, left side: andesite.
(22). 51·6. Between Seatoller and Seathwaite, roadside quarry: much altered andesite.
(23). 53·55. Seatoller Fell: 'andesitic basalt'; sp.gr. 2·88.
(24). 58·69. Thornthwaite Crag, below cairn: andesite (analysis made on material picked free from amygdules).

The five following are from the same author's Notes on the Ash-Slates of the Lake District,‡ four being by Mr. G. Patterson and the last by Dr. Cohen. Of the first two rocks complete analyses were made; of the remaining three only the silica and alkalies were estimated. For Nos. (25), (26), and (28) the material before analysis was treated with hydrochloric acid and potash to extract the chloritic matter. No. 30 is from a complete analysis by Mr. Hutchings published in another paper.§

(25). 69·22. Mosedale, near Shap: ash-slate (extracted).

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* Quart. Journ. Geol. Soc., vol. xlvii., pp. 293, 302, 1891; vol. xlix., p. 361, 1893.

† Geol. Mag. for 1891, pp. 536-544.

‡ Geol. Mag. for 1892, pp. 154-161, 218-228.

§ Geol. Mag. for 1895, p. 316.

(26). 74·88. Kentmere, below reservoir: ash-slate (extracted).
(27). 61·75. Grasmere, quarry: ash-slate.
(28). 77·40. The same extracted.
(29). 62·43. Near Ullswater, on road to Matterdale: andesite.
(30). 53·10. Wasdale Pike, near Shap granite: highly metamorphosed basic tuff.

The above references cover all the published chemical information that I have been able to discover concerning the Lake District volcanic series. The following are new. They are in all cases only silica-percentages, and to most of them I have added specific gravities taken on the specimens analysed. The first five determinations were made by students of Owens College, Manchester, under the supervision of Dr. A. Harden.

(31). 69·48. Illgill Head, Wastwater, on N.E. slope: compact rock with lenticular streaky structure; sp.gr. 2·682.
(32). 48·68. Illgill Head, S.W. side, near Devil's Slidegate: porphyritic basalt of Eycott type; sp.gr. 2·706.
(33). 56·2. Great Barrow, Boot: a highly metamorphosed outlier resting on the Eskdale granite; sp.gr. 2·790.
(34). 63·1. Upper part of Eskdale: hornstone (altered fine tuff); sp.gr. 2·755.
(35). 66·59. Sca Fell, a little S. of summit: dark garnetiferous rock; sp.gr. 2·704.

The seventeen silica-percentages which follow are by Mr. E. J. Garwood.

(36). 52·6. Galleny Force, Greenup Gill: basalt; sp.gr. 2·757.
(37). 52·95. Brimfull Beck, Overbeck, Wastwater: porphyritic basalt; sp.gr. 2·738.
(38). 53·45. Randal Beck, Mardale: porphyritic basalt (Eycott type); sp.gr. 2·736.
(39). 54·6. Gatescarth Pass, Mardale; porphyritic basalt; sp.gr. 2·776.
(40). 58·65. Pooley, Ullswater: andesite; sp.gr. 2·708.
(41). 61·45. Stoneside Fell, Bootle, N. slope: andesite.
(42). 62·95. Whiteside Bank, Helvellyn: porphyritic andesite; sp.gr. 2·744.
(43). 56·95. Fordingdale Force, Measand Beck, Haweswater: crushed porphyritic lava.
(44). 61·95. Crags Mill, Shap: crushed porphyritic lava.
(45). 66·95. Frith Wood, Rosthwaite: crushed lava, garnetiferous.
(46). 76·95. Frith Wood: breccia.
(47). 54·6. Borrowdale quarries: agglomerate-slate.
(48). 53·45. Honister quarries: ash-slate.

(49). 61·25. Tilberthwaite quarries: ash-slate.

(50). 56·60. Hanging Knott, Bow Fell: hornstone (altered fine tuff); sp.gr. 2·667.

(51). 73·45. Upper part of Measand Beck: rhyolite intercalated in basalt group.

(52). 82·25. Near Haweswater, ¼ mile S.E. of Walla Crag; rhyolite, probably altered.

The following I received from the late Mr. Thos. Tate in correspondence, but unfortunately without any precise locality.

(53). 83·8. Lake District rhyolite [probably with some secondary quartz].

Finally Mr. Marr has communicated to me the seven given below, the work of Messrs. G. MacFarlane and H. H. Thomas. In each case the first number given is by the former and the second by the latter of the two analysts.

(54). 54·9 and 54·8 (mean 54·85). Scale Force, Crummock; lava in Skiddaw Slates.

(55). 54·3 and 54·9 (mean 54·6). Mousegill quarry, Wilton Fell, near Egremont: lava with porphyritic augite; sp.gr. 2·831.

(56). 54·5 and 54·2 (mean 54·35). E. of summit of Falcon Crag, ? base of No. 5 of Ward's section: lava with porphyritic augite.

(57). 61·2 and 61·5 (mean 61·35). Falcon Crag section, base of lava No. 10 of Ward: andesite.

(58). 57·4 and 57·1 (mean 57·25). About ¼ mile N.W. of Castle Crag, Borrowdale: compact lava.

(59). 64·5 and 63·9 (mean 64·2). E.N.E. of Stonethwaite Church, Borrowdale: garnetiferous rock, ? lava.

(60). 55·7 and 55·9 (mean 55·8). Great Barrow, Boot: a highly metamorphosed lava resting on the Eskdale granite [a different specimen from No. (33)].

In conclusion I give a selection of specific gravities of rocks not examined chemically, arranging them in numerical order for convenience of reference.

2·852. Wastwater, W. side, by road: basalt with porphyritic augite.

2·849. Brotto, St. John's Vale: basalt with porphyritic augite.

2·837. Matterdale, S.W. of Church: basalt.

2·833. S.E. of Lanty Crag, Butterwick: basalt.

2·819. Oliver Gill: metamorphosed porphyritic basalt, close to Eskdale granite.

2·810. Lingmell Gill, at about 500 feet: basalt, porphyritic.

2·799. Witcham valley, roadside: basalt with porphyritic augite.

2·791. Clerk's Leap, Thirlmere: porphyritic basalt.

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2·790. S.E. of Ritchie Crag, near Mardale: basalt with porphyritic augite.
2·784. N.W. of Gosforth Crag: basalt.
2·783. E. of Kail Pot, Eskdale: basalt.
2·782. Lingmell Gill at about 850 feet: basalt.
2·782. S. of Stepping-stones, Swindale Church: basalt.
2·779. Clough Head, Threlkeld: basalt.
2·763. Ewe Crag, S. of Ullswater: basalt.
2·758. Hallin Fell, Ullswater, near summit: basalt.
2·757. Barrow Crag, Ravenglass: basalt.
2·753. Hallin How: compact basalt.
2·753. Melmerby, Eden valley: porphyritic hypersthene-basalt (Eycott type).
2·744. Black Sail Pass, summit: porphyritic basalt.
2·741. S.W. (¼ mile) of Mosedale Cottage, near Swindale: basalt.
2·739. Iron Crag, Shoulthwaite: pyroxene-andesite.
2·729. The Hawk, Appletreeworth Beck.
2·726. Upper part of Watendlath valley: andesite, garnetiferous.
2·723. Kidsty Pike: porphyritic and garnetiferous.
2·714. Thornthwaite Force, below Naddle Bridge, Haweswater: porphyritic lava.
2·714. Falcon Crag, Keswick: andesite, No. 2 of Ward's section.
2·711. Sty Head Pass, summit: garnetiferous rock.
2·709. Tippy Hills, Greystoke Park: lava.
2·705. Eel Coop, Naddle Bridge: lava.
2·698. Woof Crag, between Mardale and Swindale: compact garnetiferous lava.
2·696. Powley's Hill, Hareshaw, between Mardale and Swindale: with streaky structure.
2·678. Swindale Beck, Knock, Eden valley: rhyolite flow in Coniston Limestone group.
2·678. Backside Beck, Sedbergh: lower flow of rhyolite in Coniston Limestone group.
2·676. Hanging Knott, Bow Fell: hornstone.
2·656. Roadside by Lower Yewdale, Coniston: rhyolite.
2·646. Drygill Head, Carrock Fell: rhyolite (in loose blocks).
2·628. Falcon Crag: compact andesite, No. 4 of Ward's section.
2·625. Taith's Gill, Sedbergh: spherulitic rhyolite in Coniston Limestone group [? intrusive].
2·619. Glenridding, Ullswater: ? rhyolite.
2·575. Great Yarlside: spherulitic rhyolite.
2·550. Great Yarlside: laminated rhyolite.

SOME POLYZOA, ETC., FROM WALNEY AND BARDSEA, NORTH LANCASHIRE.

S. LISTER PETTY,
Ulverston, North Lancashire.

It is stated in Vol. I. of the 'Fauna of Liverpool Bay,' 1886, that the portion of the area between Blackpool and Fleetwood was the least worked. But the higher, say Fleetwood to Morecambe, is still less known, and so far as evidence at present goes, the portion of Morecambe Bay from the town of the name to Barrow is unknown to workers on the Hydroida and Polyzoa. Why, I do not know, unless it be that 'working men' prefer to visit good collecting places. The following short list is given as a contribution towards the extension of range of these classes in Lancashire. All were collected on Walney Island last August, during an hour or so I had to spare, after hunting for a plant, unseen since 1888. If any reader has specimens from this area I shall be glad to name them. Besides the zoophytes and polyzoa some sponges rewarded me, and I have to thank Mr. Hornell, of Jersey, for their names. With the exception of *Sertularia gracilis* all were dead; it was not only alive but in fine fruit. Unlike the experience at Filey, *Corallina officinalis* L. at Walney was a good host; even a sponge (*Hymeniacidon caruncula*) was attached to it.

The names and order follow Hincks' books on Hydroida and Polyzoa.

POLYZOA.

Eucratea chelata L. On *Sertularia argentea*.

Gemellaria loricata L. On *Flustra* and *Fucus vesiculosus* L.

Scrupocellaria reptans L. On *Flustra*.

Bicellaria ciliata L. In fruit on *Furcellaria fastigiata* Lamour.

Flustra folicea L. In quantity. Seen also at Bardsea.

Membranipora pilosa L. On *Furcellaria fastigiata* and *Flustra*.

Membranipora membranacea L. On *Tubularia*.

Microporella ciliata Pallas. On *Corallina* and *Furcellaria*.

Crisia eburnea L. In fruit on *Flustra* and *Corallina*. There were no specimens of *C. denticulata*, though carefully sought.

Amathia lendigera L. On *Corallina*.

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HYDROZOA.

Tubularia indivisa L. A good piece.

Obelia geniculata L. On *Fucus*; Bardsea, on the same.

Campanularia verticillata L. On *Furcellaria*.

Sertularia gracilis Hassall. In fruit on *Fucus*.

Sertularia argentea E.&S. In fruit on *Tubularia*; a few broken bits, Bardsea.

Hydrallmania falcata L. On a sponge (*Halichondria panicea*); a few bits, beach, Bardsea.

SPONGES.

Spongelia fragilis Schmidt.

Halichondria panicea Johnst.

Hymeniacidon carunculum Bk.

All common species no doubt.

(The synonyms—perhaps the older names—in 'Fauna of Liverpool Bay' are *Dysidea fragilis* Johns., *Amorphina panicea* S., and *A. caruncula* S., respectively.)

BOOK NOTICES.

'**A** | **Dictionary** | **of** | **Bird Notes,** | To which is appended a Glossary of Popular | Local and Old-fashioned Synonyms of | British Birds. | By **Chas. Louis Hett.** | — | Price 2/6. | — | Jacksons', Market Place, Brigg, | 1898,' is a **small cloth bound volume of 138 pages, by one of our** Lincolnshire ornithologists. The little book is calculated to be of considerable utility as a work of reference, and the glossary of popular local and old-fashioned names is particularly acceptable. The first part of the dictionary is devoted to the notes, in alphabetical order, thus —

A-chuck, a-chuck. Common Snipe.
A-chuck, chuck, chuck. Common Sandpiper.

The second part is a similar alphabetical arrangement of birds and their notes, thus—

Alpine Accentor (44). Call, 'tri-tri-tri.' Note, 'chick-ick-ick.'

Then comes the glossary of popular local and old-fashioned names, which serves also as an index to the previous parts of the book. Following this is a systematic list of British birds as it stood in 1883, copied from the B.O.U. list. A list of terms applied to wild fowl and a postscriptum bring the book to a close. Every one will cordially sympathise with the author's wish to facilitate the identification of birds by out-door observation which does not involve their destruction.

'**Insect Lives** | **as told by themselves,**' a small book by **Edward Simpson,** published last September by the Religious Tract Society, and marred by the absence of date so frequent with those publishers, lies before us. There are twenty-three illustrations, and the nineteen chapters are headed by such titles as 'a successful trapper,' 'a little nuisance,' 'a tale from a tub,' and so forth. The idea of putting these sketches of popular entomology in the first person singular is that the author hopes his readers will be led to take greater interest in them. The price is 1s. 6d.

MOSSES AND HEPATICS OF STRENSALL COMMON.

WILLIAM INGHAM, B.A.,
Organising Inspector of Schools, 47, Haxby Road, York.

THIS List contains the Mosses and Hepatics I have gathered and examined during the last two years.

This Common, which has been the happy hunting ground of bryologists during past years, has lately altered very much in character, owing to the military encampment and to the consequent drainage. Some of the Mosses and Hepatics for which the Common was once famous have become extinct. The present List may be interesting, as showing what Mosses and Hepatics still exist under the altered conditions.

The List is by no means complete, but contains only those that have been examined and verified and that are now in my Herbarium.

The nomenclature followed is the same as that for the 'Skipwith Common Mosses and Hepatics,' and the plants have been kindly verified by the same gentlemen as those mentioned in connection with Skipwith Common.

I may mention that the rare moss *Dicranum spurium* is now much dwarfed in habit, and almost extinct.

The Common at the present time is undoubtedly richest in *Sphagna*; I mean the *quality*, not the quantity. The soil here, as on Skipwith Common, is siliceous, but the Mosses are not as fine as those on the latter Common, through lack of moisture.

SPHAGNACEÆ.

Sphagnum ***cymbifolium*** Ehrh.
Sphagnum ***cymbifolium*** v. ***squarrosulum*** N.&H.
Sphagnum ***cymbifolium*** v. ***congestum*** Schp.
Sphagnum ***papillosum*** Lindb.
Sphagnum ***papillosum*** v. ***confertum*** Lindb.
Sphagnum ***rigidum*** v. ***compactum*** Schp.
Sphagnum ***tenellum*** Ehrh.
Sphagnum ***subsecundum*** Nees.
Sphagnum ***subsecundum*** formā.
Sphagnum ***subsecundum*** v. ***contortum*** Schp.
Sphagnum ***subsecundum*** v. ***contortum*** formā.
Sphagnum ***subsecundum*** v. ***viride*** Boul.
Sphagnum ***squarrosum*** formā ***compacta.***
Sphagnum ***acutifolium*** Ehrh.
Sphagnum ***acutifolium*** v. ***arctum*** Braithw.

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Sphagnum acutifolium v. ***patulum*** Schp.
Sphagnum intermedium Hoffm.
Sphagnum cuspidatum Ehrh. ***Sphagnum fimbriatum*** Wils.

TETRAPHIDACEÆ.

Tetraphis pellucida Hedw.

POLYTRICHACEÆ.

Catharinea undulata W.&M.
Catharinea undulata v. ***minor*** W.&M.
Polytrichum juniperinum Willd. ***Polytrichum urnigerum*** L.

DICRANACEÆ.

Dicranella heteromalla Schp.
Campylopus pyriformis Brid. ***Campylopus flexuosus*** Brid.
Dicranum Bonjeani De Not.
Dicranum Bonjeani v. ***rugifolium*** Bosw.
Dicranum spurium Hedw.
Ceratodon purpureus Brid.
Leucobryum glaucum Schp.

FISSIDENTACEÆ.

Fissidens taxifolius Hedw.

GRIMMIACEÆ.

Rhacomitrium lanuginosum Brid. See note on Skipwith Common Mosses.

TORTULACEÆ.

Weissia microstoma C.M.
Weissia microstoma v. ***obliqua*** C.M.
Barbula fallax Hedw.
Barbula fallax v. ***brevifolia*** Schultz. c.fr.

FUNARIACEÆ.

Funaria hygrometrica Sibth.

MEESIACEÆ.

Aulacomnium palustre Schwgr.

BARTRAMIACEÆ.

Philonotis fontana Brid. A form approaching *Philonotis adpressa* Ferg.

BRYACEÆ.

Webera nutans Hedw. ***Webera albicans*** Schp.
Bryum uliginosum B.&S. ***Bryum bimum*** Schreb.
Bryum pallens Sw.
Mnium hornum L. c.fr.

LESKEACEÆ.

Thuidium tamariscinum B.&S.

HYPNACEÆ.

Brachythecium albicans B.&S.
Brachythecium rutabulum B.&S.
Brachythecium rutabulum v. ***longisetum*** Bry. Eur. c.fr.
Brachythecium purum Dixon.
Eurhynchium prælongum B.&S.
Eurhynchium Swartzii Hobk.
Plagiothecium denticulatum B.&S.
Hypnum riparium L. ***Hypnum polygamum*** Schp.
Hypnum stellatum Schreb. ***Hypnum chrysophyllum*** Brid.
Hypnum elodes Spr.
Hypnum aduncum Hedw. v. ***intermedium*** Schimp.
Hypnum lycopodioides Schwgr. ***Hypnum fluitans*** L.
Hypnum fluitans v. ***falcatum*** Schimp.
Hypnum fluitans v. ***Arnellii*** Sanio.
Hypnum exannulatum Gümb.
Hypnum intermedium Lindb. ***Hypnum cupressiforme*** L.
Hypnum cupressiforme L. var. between v. ***lacunosum*** Brid. and var. ***elatum*** Schp.
Hypnum cupressiforme L. v. ***lacunosum*** Brid.
Hypnum cupressiforme v. ***ericetorum*** B.&S.
Hypnum imponens Hedw. ***Hypnum patientiæ*** Lindb.
Hypnum molluscum Hedw. ***Hypnum cordifolium*** Hedw.
Hypnum giganteum Schp. ***Hypnum cuspidatum*** L. c.fr.
Hypnum Schreberi Willd.
Hylocomium squarrosum B.&S.
Hylocomium triquetrum B.&S.

HEPATICS.

Kantia trichomanis L.
Cephalozia bicuspidata L.
Cephalozia lammersiana Hüben.
Cephalozia connivens Dicks.
Odontoschisma sphagni Dicks.
Diplophyllum albicans L.
Lophocolea heterophylla Schrad. ***Lophocolea bidentata*** L.
Jungermania inflata Huds. c.fr.
Jungermania crenulata Sm.
Nardia scalaris Schrad. ***Nardia geoscyphus*** DeNot. c.fr.
Pellia epiphylla L. ***Pellia calycina*** Tayl.
Aneura sinuata Dicks.
Fossombronia pusilla L.

February 1899.

MOSSES NEW TO YORKSHIRE, AND ADDITIONAL RECORDS OF RARE MOSSES.

WILLIAM INGHAM, B.A.,

Organising Inspector of Schools, 47, Haxby Road, York.

Fontinalis antipyretica var. ***gigantea*** Sull. This rare moss I found in a small stream at Saxton, in Mid-West Yorkshire, 17th May 1897. Both Dr. Braithwaite and Mr. Dixon have seen it and say it is quite right.

Hypnum molluscum var. ***fastigiatum*** Boswell. This moss I found 9th April 1898 on the Hambleton Hills, near Kilburn. Mr. Dixon says my gathering agrees exactly with a Staffordshire specimen he has. This is the moss that, when first found in Derbyshire, was referred to *Hypnum canariense* Mitt.

Hypnum uncinatum Hedw. var. ***plumosum*** Schp. This I found on a tree at Saltburn, 17th September 1897. It is a very delicate and beautiful moss, intermediate between the type and the var. *plumulosum* Schp. Verified by Mr. Dixon.

Hypnum Wilsoni var. ***hamatum*** Lindb. In a bog near the White Force, Teesdale, 5th June 1897. Verified by Mr. Dixon.

Amblystegium Kochii B.&S. In addition to the two localities mentioned in 'The Naturalist' for July 1898, I have found this moss on Clifton Ings, York, 18th July 1898. The Ings plant agrees exactly with German and Austrian specimens.

Ceratodon conicus Lindb. On the Hambleton Hills, near Kilburn, 19th April 1898. The leaves in this gathering are of a beautiful claret colour, passing into green below.

Tortula brevirostris H.&Grev. In the Huddlestone Quarry, Sherburn-in-Elmet, 26th April 1897. This is a new moss for the West Riding. Verified by Mr. Dixon.

Bryum cæspiticium var. ***badium*** Brid. In Arncliffe Woods, Eskdale, 12th May 1897. Both Dr. Braithwaite and Mr. Dixon have specimens of this moss from me.

The first four mosses and the last one in this List are new to Yorkshire as far as I can discover.

LINCOLNSHIRE NATURALISTS AT WOODHALL SPA AND TUMBY WOODS.

REV. EDWARD ADRIAN WOODRUFFE-PEACOCK, L.Th., F.L.S., F.G.S.,

Vicar of Cadney; Organising and Botanical Secretary, Lincolnshire Naturalists' Union.

THE nineteenth meeting of the Lincolnshire Union was held at Woodhall Spa for a visit to Tumby and Fulsby Woods, in Div. 10, on the 18th of August. As usual at the time of year the meeting was a small one, many members being away on their holidays, but the company included the President, the Rev. W. Fowler, Mr. F. M. Burton, F.L.S., F.G.S., Rev. S. C. Wood, of Great Ponton; Dr. R. T. Cassal, of Ashby; Messrs. B. Crow and T. Gelsthorpe, of Louth; Mr. W. Lewington, of Market Rasen; Dr. G. M. Lowe, President of the Lincolnshire Science Society; Rev. H. Barker, of Wrangle; Messrs. H. Preston, F.G.S., and W. H. Kirby, of Grantham; the Rev. J. Conway Walter, of Langton; Mr. H. M. Hawley and his son, of Tumby Lawn; Mr. J. Eardley Mason, of Lincoln; the Rev. F. S. Alston, of West Ashby; Mr. G. Alston Ling, and the Organising Secretary.

The party drove in carriages from Woodhall Spa Station through Roughton and Kirkby-on-Bain parishes to Fulsby and Tumby Woods, where they worked all day under the guidance of Mr. H. M. Hawley and the Rev. J. Conway Walter. The usual high tea followed at the Swan Inn, Tumby.

Mr. Henry Preston, F.G.S., said that the geologists had enjoyed a pleasant and easy time, the actual work of the day having been done by devotees of other branches of Science. But Tumby Wood could tell of something else besides botany, and entomology, and black ants; it represented an interesting section in one of the later chapters of Earth History. The wood stands on a bed of ancient gravel, composed principally of sub-angular fragments of flint which have been derived by denudation from the underlying boulder clay. Mixed with the flints is to be found an occasional quartzite pebble which, like the proverbial straw, serves to show the direction from whence the ancient river came which laid down these great gravel beds. The geological map shows that these ancient gravel beds extend westwards, flanking the deposits of the Witham valley nearly up to Lincoln. Without trespassing upon the excellent paper read some time ago by our friend and Vice-President, Mr. Burton, it may be mentioned that travelling westwards

from this place and examining these ancient gravels for flints and quartzite pebbles it is found that the flints gradually decrease and the quartzites increase in quantity, until at Bardney the flints are almost absent and the gravel is almost altogether composed of quartz and quartzite pebbles. These beds are not noticed again until, having passed through the Lincoln gap, they reappear and extend in a south-westerly direction as far as the Trent valley at Newark, all the way displaying the same characteristic abundance of quartzite pebbles. Following then the valley of the Trent, these same quartzite pebbles occur until near Nottingham, the source whence they are derived, is reached, viz., the Bunter Pebble Beds, which are there traversed by the river Trent. Thus we have spent the day on the tail end, as it were, of the alluvial deposits of an ancient river Trent which, soon after the Glacial period, ran eastwards from Newark through the gap at Lincoln and on towards the Wash, instead of northwards into the Humber, as at the present time. The Witham and the Fen deposits of the Witham valley are all subsequent in date to these ancient quartzite gravels, and point to a different origin. Incidentally, Mr. Preston said that as he and Mr. Kirkby passed through Tattershall that morning they had stopped to look at the interesting ruins of the Castle, and were much interested to find that the weathered faces of the bricks indicated the local origin of the sand and gravel with which the clay was mixed previous to burning, for studded all over the burnt clay were to be found quartzite pebbles and flint fragments ranging up to as much as an inch in diameter. This was noticeable also in the mortar, and clearly showed that the mixed quartzite and flint gravels of the neighbourhood had been run upon in connection with the building of Tattershall Castle.

Personally I was too busy working at entomology to take much interest in botany. But the Rev. W. Fowler, Rev. F. S. Alston, and Mr. B. Crow each kindly sent me a list. Less than 200 flowering plants and ferns were noted. The best things were *Nepeta Cataria*, *Hieracium umbellatum*, *Marrubium vulgare*, *Salix aurita*, *Samolus Valerandi*, *Scabiosa Columbaria* (a lime-loving plant, common enough on limestone and chalk), *Calamagrostis lanceolata*, *Corydalis claviculata*, *Maianthemum bifolium*.

The Rev. J. Conway Walter sent me the following list of Mammals :—Fox, Hare, Rabbit, Mole, Squirrel, Badger (rare), Otter (rare), Hedgehog, Hanover Rat, Water Vole, House Mouse, Common Shrew, Common Field Vole, Foumart (rare), Stoat (as Ermine partly white in winter, but he has seen them

entirely white with the exception of the tip of the tail), Club-tail or Weasel (on 29th June he saw a piebald specimen; it was very pretty). [The female is much smaller than the male, but which is the Club-tail I cannot learn for certain.—E. A. W.-P.].

Mr. H. M. Hawley, the Squire of Tumby, kindly supplied the following short Bird list:—Barn and Brown Owls, Reed Bunting, Redpoll, Goldfinch, Bald Coot, Peregrine Falcon, Hawfinch, Nightingale, Heron, Kingfisher, Greater and Lesser Spotted Woodpeckers, Redstart, Creeper, Shoveller and Tufted Ducks, Quail, Woodlark, Wheatear (in Roughton Wood), Gold-crested Wren, Dipper, and Yellow Wagtail (as a winter visitant).

The following list of Fish from the Horncastle neighbourhood was supplied by the Rev. J. Conway Walter:—Trout, Grayling (imported from Claythorpe, where it was originally introduced; it is now breeding in the river Bain), Pike, Roach, Rudd, Dace, Bleak ('Blick' locally), Chub, Carp (ponds at Wispington, etc.), Bream (Witham, etc.), Tench (ponds at Woodhall, etc.), Minnow, Stickleback (the male who guards the nest, 'Blue-eyed Sailor'), Miller's Thumb or Bullhead (Horncastle Canal, Waring and Bain rivers, as much as four inches sometimes), Stone Loach (Horncastle Canal, etc.), Eels (everywhere), Burbot (Witham; it has the flavour of the Eel), Lamprey (or Nine-Eyed Eels, from the holes in its gills, Waring river).

The following is a list of Lepidoptera seen or taken by Mr. W. Lewington between Woodhall Spa and Tumby:—

Pieris brassicæ.
Pieris rapæ.
Pieris napi.
Colias edusa, ♂.
Argynnis aglaia.
Argynnis paphia.
Vanessa io.
Vanessa atalanta.
Apatura iris.
Pararge megæra.
Epinephele janira.
Epinephele tithonus.
Epinephele hyperanthus.
Thecla quercûs.
Polyommatus phlœas.
Lycæna icarus.
Hesperia thaumas.
Spilosoma mendica. Two larvæ.
Psilura monacha.
Plusia gamma.
Geometra papilionaria.
Cidaria immanata.
Eubolia limitata.

The following Insects, collected by W. Lewington and E. A. W. Peacock, were named by Rev. A. Thornley:—

NEUROPTERA.

Sympetrum sp.

HYMENOPTERA.

Vespa germanica. One ☿.
Vespa vulgaris. One ☿.
Bombus lapidarius. One ☿.
Bombus hortorum. One ♀.
Formica rufa. Several ☿s.
Crabro cribrarius. One ♀.
Crabro albilabris. One.
Halictus leucopus. One ♂.
Apis mellifica. Two ☿s.

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DIPTERA.

Platychirus clypeatus.
Scatophaga stercoraria.
Calliphora vomitoria.

COLEOPTERA.

Geotrupes spiniger. One ♀.
Geotrupes stercorarius. One ♀.
Coccinella 7-punctata. Two.
Coccinella variabilis. Several.
Strangalia armata. Two.
Lagria hirta. One.
Polydrusus pterygomalis. One.
Strophosomus coryli. Several.
Otiorrhynchus picipes. One.
Psylliodes cupro-nitens. One.
Ragonycha fulva. One.
Meligethes æneus. Several.
Necrophorus humator. Six.
Necrophorus ruspator. Three.
Necrophorus mortuorum. Two.
Aphodius rufipes. One.

Several undetermined Orthoptera and Diptera.

The following species of Hemiptera-Heteroptera, collected in Fulsby Wood by Rev. E. A. W. Peacock, were named by Mr. J. Eardley Mason:—

Miris lævigatus L. Two.
Calocoris roseomaculatus DG. One.
Calocoris bipunctatus Fab. One.
Leptopterna ferrugata Fall. One.
Ætorhinus angulatus Fall. One.
Orthotylus scotti Reut. One.
Nabis lativentris. Four, all immature.

The following were collected in Tumby Wood by Mr. J. E. Mason. Those marked * are new to Lincolnshire.

*Piezodorus lituratus Fab. Abundant on furze (*Ulex europæus*). Immature; one mature.
Stygnus rusticus Fall. Several at roots of heather (*Calluna*).
*Dictyonota strichnocera Fieb. Some on furze.
Miris calcaratus Fall. One.
*Orthotylus ericetorum Fall. Abundant on heather.
*Onychumenus decolor Fall.
*Psallus alnicola D.&S. One off birch.
Asciodema obsoletum D.&S. Several off furze.
Lygus viridis Fall. One off birch.

A few more await further examination.

The Spiders taken were:—

Anyphæna accentuata Walck.
Epeira gibbosa C.L.Koch. This is a first record for the whole county.
Dictyna arundinacea L.
Diœa dorsata Fabr. Another first record for N. and S. Lincs., 54 and 53.
Epeira quadrata C.L.Koch.
Epeira scalaris Walck.
Meta segmentata C.L.Koch.
? Epeira marmorea C.L.Koch. 'This is not certain. The true marmorea has not in the adult state yet been recorded in Britain.' — Rev. O. Pickard-Cambridge.
Xysticus pini Hahn. A new record again.
Epeira sollers Walck.
Linyphia triangularis C.L.Koch.
Theridion varians Hahn.

The Harvest-men or Phalangidea which have been taken this season in Lincolnshire will be published in a separate list later. The Rev. J. Conway Walter read some natural history notes, which will also appear later.

NOTE—LEPIDOPTERA.

***Arctia lubricipeda* var. *radiata* at Kirby Moorside.**—Mr. Reginald H. Barker, of Scarborough, when acknowledging some specimens of *A. radiata* I recently sent him, wrote that when staying at Kirby Moorside three or four years ago he brought back several larvæ of *Arctia lubricipeda*, one of which produced a specimen of *radiata*. So very few of this form of the species have been taken in this country in an actually wild state, that this occurrence ought to be placed on record.—GEO. T. PORRITT, Crosland Hall, Huddersfield, 15th February 1899.

Naturalist,

YORKSHIRE BATS.

OXLEY GRABHAM, M.A., M.B.O.U.,
Chestnut House, Heworth, York.

It often appears curious to me how few, how very few, people ever seem to take the trouble to investigate the habits and economy of these little creatures, or even care to know how many species we have in our islands. My enquiries on the subject are generally met with the reply, 'Oh, we have the Long-eared Bat, the Short-eared, and the Common Large Bat,' and I am often asked most wonderful questions concerning them, as to whether they are not really birds? If they lay eggs? Where they make their nests? etc., etc., and by the great majority of people they are looked upon as beasts of evil omen, blood-suckers, frequenters of church-yards and other unclean places. Yet they are by no means without interest, and I need scarcely say bring forth their young in the same way as other mammals do. I have at various times kept nearly all our British species in confinement, and though they can scarcely be called amusing pets, still they exhibit a certain amount of intelligence, and soon become tame enough to take a moth, beetle, fly, or piece of raw meat from their master's hand. I have heard the term 'flittermouse' applied to them, but in the Holderness district they are always known as 'blackbeeraways'—mothers frightening their unruly children by calling on the black object to bear them away. Varieties are very rare, and out of the scores of Bats that I have at various times examined I have only seen one such specimen. This was taken in May 1898 by the Hon. A. H. Baring, of the Grange, Alresford, Hants, being found by him, as recorded in the 'Zoologist' for June, nailed to a barn door, and in an advanced state of decomposition. Mr. Baring very kindly sent me this Bat to examine. It was a Long-eared one, and a pure albino, fur very long and silky, and all the membranes and ears very light coloured. Bats are very subject to the attacks of parasites. Sometimes they are perfectly free from them, and at others they positively swarm with them. A short time ago, when skinning a Lesser Horse Shoe Bat, I took no less than eighteen large parasites from it, which have been most kindly named for me by Mr. Ernest E. Austen, of the British Museum, as *Nycteribia hermanni* Leach.

In the month of January 1893 my friend Dr. Tempest Anderson, of York, tells me the station-master's house at North Grimston, on the N.E.R., was found to be swarming with a

curious kind of parasite. So troublesome did these become that, as no remedy was forthcoming, preparations were made for pulling down part of the house, and on the work being commenced, no less than between two and three hundred Bats were found between the laths and plaster. Unfortunately none of these Bats or parasites have been preserved. Bell's 'British Quadrupeds' is still the standard work on the subject, and the account he gives of the British Bats is excellent as far as it goes, but it does not go far enough. Of enemies, besides the Bat collector, must be mentioned owls and cats, both of which latter I have seen making a meal off them. The haunts of Bats are numerous—holes in trees, holes and crevices in walls, behind shutters and signboards, in belfries and church towers, and in caves, old workings, etc. Their capture may be brought about by shooting; I have secured many specimens by using a No. 3 Saloon Pistol, using, of course, very small shot; and when I watched them coming out of a hole, be it in tree or in brick, the next evening, before dusk, I have fastened a small piece of netting over the hole; the Bats in due course fly into it, get entangled, and are easily captured. They will sometimes come down to a lantern or light-coloured object thrown up in the air. They are not infrequently caught with a fly, and when hybernating may be found together in great numbers; but unless wanted for scientific purposes, it is a very great pity to kill them; they are perfectly harmless, and do much good by preying on cockchafers and other beetles. How the expression, 'blind as a Bat,' originated, I know not; for not only have all our Bats eyes of considerable size, but that they can and do use them I have had ample proof; though from some interesting but cruel experiments that were made some time ago by Spallanzani, it was proved that they depended 'on the exquisite sense of touch of the whole surface of the flying membrane' to tell them of the approach of any solid body when threading their way through the branches of trees, etc. When Messrs. Clarke and Roebuck brought out their list of Yorkshire Vertebrates—of which most useful work I would fain see a new edition—six species of Bats were recorded for the county; now the number has advanced to eight; and I see no reason why, with further investigation, a still greater increase should not be made. Of these eight species, seven are in my own collection. To take them in order:

1. ***Vesperugo noctula.*** **The Noctule** or **Great Bat.** Sometimes called *V. altivolans*, owing to its habit of hawking about very high up in the air; is common throughout the

county. It has a greater expanse of wing than any of our British species, and I have taken specimens measuring over fourteen inches from tip to tip. Last summer, Mr. John Clayton kindly sent me about thirty which were taken out of an old hollow tree at Grimston Park. I let most of them go, with the exception of three or four very young ones, which were only just beginning to show indications of fur. They were dark leathery-looking objects, and reminded me of very young cormorants as much as anything. I have seen this bat dip into a pool of water in the twilight, either for the purpose of having a drink or for ablution. I put four adults into a loose box where I kept a large Tawny Owl, intending to examine them in the morning for parasites; but I found *Syrnium aluco* had pulled off and eaten the head of each, and thrust a headless body into each of the four corners of the stall. Bell is most certainly wrong in stating that 'this Bat is seldom seen abroad much later than July.' I have frequently in mild seasons seen it on the wing in the evenings up to the end of the first week in October.

Mr. W. Denison Roebuck remarks that Yorkshire seems to be the northern limit for this species; extremely few records exist for counties further north, while in Yorkshire it is not uncommon throughout.

2. ***Vesperugo leisleri.*** **Leisler's Bat** or **Hairy-armed Bat.** The latter name given to it because of a broad band of short hair extending along the inferior surface of the forearm. But the Noctule also has this feature quite as fully if not more developed. I have never taken this Bat myself or had it sent to me, but I am always on the look-out for it. Messrs. Clarke and Roebuck say that three were obtained by the late F. Bond about fifty years ago from an old factory chimney at Hunslet, near Leeds. Leisler's Bat is considerably smaller than the Noctule and of a darker colour, as mentioned above. Both these Bats have the hair on the surface of the membrane adjoining the forearm, on the underside. Perhaps the larger animal has this character most developed. They differ also in the size and arrangement of the teeth. Dobson separates them thus: 'In *V. noctula* the fur is uni-coloured above and beneath, or the colour of the hair is slightly paler towards the bases; while in *V. leisleri* the terminal one-fourth of the hairs above is bright yellowish-brown, beneath *light* brown, the basal three-fourths of the fur on both surfaces *dark* brown. The outer upper incisor also in *V. leisleri* is equal to the inner incisor in cross section at its base, but in *V. noctula* it is double the size

of the same tooth at its base. The lower incisors in *V. leisleri* stand in the direction of the jaws, a semicircle with hardly any overlapping; in *V. noctula* they are crowded and parallel, set obliquely, and largely overlap one another.'

In 1881 Mr. Roebuck had some correspondence with Mr. Frederick Bond on the subject of this record. Mr. Bond wrote under date 17th May of that year as follows:—'About 40 years ago I paid a visit to Leeds and amused myself collecting insects, when I saw in the possession of a working man who also collected insects for his own amusement 3 specimens of the Bat, all injured by the larva of a Beetle, *Dermestes* sp. Only one was fit to keep, which was kindly given to me; he told me he took them from an old factory chimney shaft a few months before I saw them, I think at Hunslet. The two specimens that I did not have were so badly injured by the Dermestes larva that they were worthless. In 1874 I received two fine ♀ specimens from Tanderagee, Co. Armagh. They were taken from hollow beech trees, with several others. The Yorkshire specimen is a ♂.' Mr. Roebuck also reminds me that in 'The Zoologist' for September 1892, p. 329, there is a note on this species by Mr. H. Charbonnier, who recorded several shot near Mexborough, but the Editor suggests that they might have been confused with young Noctules.

3. ***Vesperugo pipistrellus.*** **Pipistrelle** or **Small Bat.** Is the smallest of our British Bats, and the commonest. Throughout the county it is universally distributed. In mild seasons it is on the wing almost uninterruptedly throughout the year, and I have frequently seen it abroad at midday. It is very fond of hawking at night in any sheltered place, farm-yards, etc., and it rests in any convenient crevice. It varies much in colour, as most Bats do, some specimens being very dark. It is easily tamed and lives well in captivity.

4. ***Vespertilio nattereri.*** **Natterer's** or the **Reddish-Grey Bat.** The latter term is to my mind a misnomer, as, though I have examined many specimens of this Bat, I can distinguish very little red about them. However, as I said above, Bats vary greatly in colour, and the food, surroundings, soil, etc., in certain places, may have, and to my mind undoubtedly do have, an effect on the colours of animals, so that the same species from widely-different localities may be very differently coloured. This Bat is either rare or overlooked in the county. Messrs. Clarke and Roebuck record two as having been taken from a tree in Oakwell Wood, Birstal.

I myself have only once taken this Bat, and that was at Flaxton on 9th August 1895. It is easily recognisable by its long ears and tragus, light-coloured under parts, and long spur. ('The spur is a long, tendinous process from the heel of the foot, which runs along the margin of the interfemoral membrane, and serves to stretch it. It, in fact, represents the os calcis. It will be found of very different length in different species, varying from three to seven lines or more.'—Jenyns.) Between the end of the spur and the tip of the tail the membrane is crenate or puckered and set with numerous short hairs. This character at once distinguishes the species. It is very gregarious. My friend, Mr. James Backhouse, had over thirty sent to him last summer from Wales, old and young. Examples of both he very kindly gave me for my collection, and the young he described for the first time in 'The Zoologist' for December 1898. They are quite unlike the old in colour, being pure white beneath, and mouse-grey above, but in other characters exactly resemble adult specimens. In old and young the transverse lines on the interfemoral membrane are few compared to those found in the same part in the Whiskered and Daubenton's Bats.

Mr. Roeback has had this Bat sent often, and has usually considered it as at least as common in Yorkshire as *V. mystacinus*. He has had it or seen it from Thorp Arch, Bingley, Nidderdale, and other places.

5. ***Vespertilio daubentonii.*** **Daubenton's Bat.** Is not recorded by the authors of 'Yorkshire Vertebrates.' I have had four sent to me during the past summer, taken in different parts of the county. The first was very kindly sent to me in June by Mr. George Parkin, of York Street, Wakefield; it had flown amongst a party of excursionists at Fountains Abbey, and had been secured by one of them. Mr. Parkin also forwarded to me two skins of this species, which had been taken some years ago from a Woodpecker's hole in Hawe Park Wood, Walton. For the fourth specimen I am indebted to the kindness of Mr. James Carter, of Burton House, Masham. The Bat was shot flying over a deep pool in the river Yore. It is essentially an aquatic species, if this term may be applied to a Bat, and may be distinguished from all others by its flight close over the surface of still water. Skins of this Bat are very easily confounded with those of the Whiskered Bat, but, as pointed out by Mr. W. E. DeWinton, the spur, vide supra, runs three parts of the distance to the tail, and there is always a distinct notch at its end. Again, the feet are noticeably larger for the size of

the Bat than in any other species, and in adult specimens the colour of the back is a dark chocolate brown. Bell states that 'the wing membranes extend only to the distal extremity of the the tibia, leaving the foot free,' but this I find to be a varying quantity, and not to be always relied on.

Mr. Roebuck informs me that the first Yorkshire example of this species was one which was sent to Mr. Clarke and himself in 1891 by Mr. Basil Carter, who shot it flying over the Yore at Masham, 19th August of that year. This is the only Yorkshire specimen he has seen. It was recorded in 'The Naturalist' for September 1891, p. 275.

6. ***Vespertilio mystacinus*. The Whiskered Bat.** For my own part I cannot see that it is more whiskered than some of its confrères. It is a small Bat, and only likely to be confused with Daubenton's. Besides the striking differences mentioned above, the spur in this Bat only extends about half way down the interfemoral membrane. The notch on the outer side of the ear is larger than in Daubenton's, and the foot is markedly smaller than in the latter species. It is a local Bat, but not rare. It has been recorded from Great Mytton, Clitheroe, near Scarborough, and I have taken it at Flaxton, in the streets of York, where it flew against a policeman's helmet, and was kindly brought to me by Mr. J. Hawkins, and last autumn I took five from behind a shutter in the village of Welwick, near Easington, in Holderness. It may be noticed flitting about with a butterfly flight, amongst the foliage of trees, and between tall hedges in a narrow lane.

So far as his experience goes, Mr. Roebuck considers this a common and widely distributed Bat. He has had it from many places, Pateley Bridge, Masham, Goathland, Ingleby Greenhow, Warsill Grassington, Pocklington, Washburn Valley, etc.

7. ***Plecotus auritus*. The Long-eared Bat.** This Bat is easily recognised from the rest of our British species by its enormous ears. It is common, but not abundant. It generally uses old buildings as a resting place, but I once took three from behind a shutter, and one of them was only about half grown. It was nearly pure white beneath. When hanging head downwards, as all Bats do when at rest, the long ears are folded back. This species is easily tamed, and does not appear to object to captivity.

8. ***Rhinolophus hipposideros*. Lesser Horse-Shoe Bat.** So called from the peculiar nasal appendage, the anterior portion of which is something like a horse-shoe in shape. This Bat

was not recorded by Messrs. Clarke & Roebuck, and it appears to be confined to the dale district of the county. I have a specimen sent me most kindly by Mr. James Ingleby, of Eavestone, who tells me that it used to be not uncommon in the caves and old workings in that district. Of its flight, except in a room, I know nothing.

Mr. Roebuck remarks that the credit of adding this species to the Yorkshire list belongs to Mr. James Ingleby of Eavestone, who discovered it near Eavestone, Ripon, as far back as 1875 if not earlier, and to Mr. H. Laver of Colchester, who identified the species for him. Mr. Laver sent Mr. Roebuck specimens about March 1882, which enabled him to record it as an addition in 'The Naturalist' for May 1882, p. 166. Since then Mr. Ingleby and Mr. W. Storey have found it in various caves in Nidderdale, Washburndale and the Ripon District.

I have to thank my friend, Mr. W. Denison Roebuck, who was a much earlier worker in this field than myself, for various notes which I have been able to incorporate in this paper.

In conclusion, I would ask readers of 'The Naturalist,' if they come across any varieties, or the young of any species, if they would most kindly send them on to me. Bats travel badly, and soon begin to decompose, so that I should infinitely prefer them alive if possible; if dead, they will keep much better if a slight incision be made in the abdomen, the entrails extracted, and a plug of cotton wool soaked in spirit, whisky will do, inserted therein. I shall be happy at any time to identify any specimens about which their owners may be in doubt; and I think we ought to still further add to our county list of Cheiroptera.

NOTES—ORNITHOLOGY.

Waxwings near Scarborough.—Mr. H. B. Hewetson, of Leeds, writing (8th February 1899) from Scarborough, says:—'A shooter was out in October last and came upon a flock of twelve Waxwings [*Ampelis garrulus* L.], and whilst creeping up to them a Woodcock rose, which he shot; this frightened the birds away. Subsequently Mr. Morley, the bird-stuffer, had seven brought to him.' JOHN CORDEAUX, Great Cotes House, R.S.O., Lincoln, 10th February 1899.

Barred Warbler in Lancashire.—I am permitted by my friend, Mr. Arthur P. Page, to place on record the occurrence of an example of the Barred Warbler (*Sylvia nisoria* Bechstein), near Fleetwood, on the 20th Aug. 1898. Mr. Page shot the bird with a 'walking-stick' gun in the presence of his sister, Mrs. E. Smythe, while walking along the edge of a small wood; and from a recent examination I believe it to be a male in adult plumage.

The original British example was detected by Prof. Alfred Newton, and is recorded in the Proc. Zool. Soc. Lond. for 1879, p. 219. The present seems to be the seventeenth example noticed in the British Islands and the first record for Lancashire.—W. RUSKIN BUTTERFIELD, St. Leonard's-on-Sea, 8th February 1899.

NOTES—ORNITHOLOGY.

Magpies and Sparrow Hawks as Foster-Parents of Game-Fowl.—In this month's number of 'The Naturalist' I notice a query from Mr. Oldham, Alderley Edge, as to whether it was formerly a practice of breeders of game fowl to place the eggs of these birds in the nests of Magpies.

I have never heard of this in connection with Magpies' nests, but I know that many years ago the pitmen of Northumberland (who were great breeders of game-fowl) used to place the eggs in the nests of the Sparrow Hawk (*Accipiter nisus*). They had an impression that by so doing the young birds would become stronger and fiercer for fighting purposes.

There is an old dismantled tower (an old pit shaft) at the north-west corner of our Town Moor where this was done year after year, and where the Sparrow Hawks were allowed to nest in safety for this purpose.—H. T. ARCHER, Newcastle-on-Tyne, 6th February 1899.

Magpies, etc., as Foster-Parents of Game-Fowl.—Referring to Mr. Oldham's note on this subject in 'The Naturalist' for February (p. 51), the following is quoted in E. Rolland's 'Faune Populaire de la France,' Tome 2, p. 139:—

'Le Coq-pie (ou Cô-pie) passe pour être très-méchant. On l'obtient en faisant couver des œufs de poule par une pie dont on déménage le nid. Les coqs qui en proviennent sont très-batailleurs.' Haut-Maine, MONTESSON.

In Holmgren's 'Skandinaviens Foglar,' Vol. 1, pp. 254, 270, the use of the nests of both *Pica pica* and *Corvus cornix* for the hatching of hens' eggs is described as practised in certain parts of Scandinavia, Östergöthland being particularly specified. The eggs are usually blackened or otherwise coloured, and the chickens, of course, removed as soon as betrayed by their piping. The author says that he can from his own experience vouch for the perfect success of the plan.

Montesson's account dates 1859, Holmgren's 1866.—P. RALFE, The Parade, Castletown, Isle of Man, 9th February 1899.

The Kingfisher in the Huddersfield District.—Mr. Joseph H. Hinchliff, of Skelmanthorpe, near Huddersfield, having seen my note on 'The Kingfisher at Huddersfield' ('Naturalist,' December 1898), wrote me the other day (10th February 1899), as follows:—'On January 6th last, I was fishing for roach in the old moat at Thornhill Hall, and observed a Kingfisher [*Alcedo ispida*] fly across the moat. Previous to this I had observed one on our own pond at Emley Old Hall, and this bird is repeatedly observed by members of our family on the pond or down the stream. Does the Kingfisher feed on such fish as the stickleback? There are sticklebacks in the above-mentioned moat and pond, and last week, when our pond was frozen over except on a few square yards where the water enters it, the Kingfisher was seen on successive days early in the morning on a willow tree which grows up out of the pond at that end. Last Saturday, I saw another Kingfisher several times by the stream just below Blacker Wood, Skelmanthorpe, and in this stream there were formerly sticklebacks, but they appear to have been killed off by sewage and mill effluents. In fact, when I observed the bird last Saturday, the stream was much discoloured by dye-water. Before this year I have never seen a Kingfisher in this district, only on the Nidd at Knaresborough and the Laver at Ripon; though the bird is sometimes seen on the lakes at Bretton Hall and Cannon Hall.'

Mr. Hinchliff kindly allows me to send the foregoing interesting notes for publication; and I may add that at the time I observed the bird on the ponds in these grounds, I concluded that sticklebacks were probably the attraction, for although the ponds also contain a number of old trout, they are, I think, much too large for a Kingfisher to tackle. Mr. A. Clarke tells me he has recently on two occasions seen the Kingfisher at Slaithwaite, so there are evidently at least several in this district.—GEO. T. PORRITT, Crosland Hall, Huddersfield, 15th February 1899.

EXTRACTS FROM A CONCHOLOGIST'S NOTEBOOK.

WILLIAM NELSON, M.C.S.,

Crossgates, Leeds; Hon. Sec., Leeds Conchological Club.

4.—FROM SELBY TO CAMBLESFORTH AND GOWDALL FOR *LIMNÆA GLABRA.*

By an early train on Saturday morning, 14th April 1887, I arrived at Selby, and at once made my way to the canal, which I had found on previous visits to be a prolific hunting ground for mud-loving mollusks. This morning, however, I was afraid was going to prove a blank, as the weather was cold, with the wind blowing from the east, the quarter most dreaded by the field naturalist. I searched for a considerable time, but was only rewarded by two or three specimens of *Limnæa peregra*. On former visits to this canal I have obtained, buried in the mud and at the roots of sedges and other mud-loving plants, *Sphærium corneum*, *Unio tumidus*, *Anodonta cygnea*, *Paludina vivipara*, *Bythinia tentaculata*, *B. leachii*, and *Valvata cristata*, the latter very common. Different parts of the canal had produced *Planorbis fontanus*, *P. albus*, *P. vortex*, *P. carinatus*, *P. umbilicatus*, *Physa fontinalis*, *Limnæa peregra*, *L. auricularia*, *L. stagnalis*, *L. palustris*, and *L. truncatula*. But this visit having produced nothing except *Limnæa peregra*, as before stated, I turned my attention to a ditch situated at the bottom of the canal embankment, where some years before I had found *Planorbis corneus* and the largest examples of *Limnæa peregra* it has been my fortune to find; but this time the ditch, like the canal, yielded nothing. I now left the canal at Stonebridge along the high road, passing Thief Lane on the left, and in a ditch near to Barlow Common I found *Planorbis spirorbis* and *Physa hypnorum*, and after searching some (what I think have been) old line ponds I found *Physa fontinalis*, *Planorbis umbilicatus*, *P. contortus*, *Limnæa peregra*, *L. palustris*, and *L. truncatula*. I searched each pond and ditch as I went along towards Camblesforth; at or opposite to a place called Marshallshaw, a little to the north-east of Camblesforth, I made a protracted search in a ditch and obtained specimens of *Limnæa glabra*. This was an unrecorded locality for this local species, and one altogether new to myself. After satisfying myself as to the aquatic mollusca in the ditch I searched among the moss on the bank-side, but only found *Zonites fulvus* and *Cochlicopa lubrica*, only single specimens of the former, and it is a curious circumstance respecting my experience of this shell that I have,

as a rule, found only scattered specimens of it, rarely more than two or three in a locality. The only exception I can call to mind at this time is finding it many years ago very common near to Seacroft Hall. Having left the ditch and passed through Camblesforth I came to a small, shallow, grass-grown pond situated in a widening of the road at a place where two or three footpaths diverge. The pond is invariably dried up in summer time. I had searched this place two or three times before and have obtained examples of *Planorbis fontanus*, *P. spirorbis*, *Limnæa peregra*, and *L. glabra*. Leaving these I next came to the large pond at Carleton Towers. Here I enlisted the sympathy and help of a farmer who was occupier of the land which surrounds that part of the pond which is cut off from the park. Learning from me that I wished to go some distance from the margin, where there was an abundance of the broad-leaved pondweed (*Potamogeton natans*), he took me to a somewhat large raft which was floating on the water, but I soon found that whatever else we were, we neither of us were experts with that kind of craft, as we were continually getting both to one end, and so submerging it until the water was running over the tops of our boots, and after all we were scarcely adequately rewarded for our exertions and discomfort. *Planorbis albus*, *P. umbilicatus*, *Physa fontinalis*, *Limnæa peregra*, and *L. palustris* being all we obtained, and those few species were only represented by one or two examples of each. Our management of the raft did not induce any desire on my part to stay long on the pond, and I was heartily glad to get away before making a still closer acquaintance with it. I next tried a ditch at a place called the Dumps, which yielded one or two examples each of *Planorbis contortus* and *Physa hypnorum*. Leaving here I crossed the river Aire by the bridge to Snaith; passing through part of the town I turned to the right, and on a hedge-bank at Pickhill Bank I found *Zonites cellarius* and *Helix arbustorum*. Still bearing to the right towards a place called Gowdall, I came to a small plot of undrained land, most certainly a piece of a former common, and after searching for some time I found examples of *Planorbis spirorbis* and *Limnæa glabra*, both being represented by few and very impoverished-looking examples. Still keeping westwards I passed through Hensall, only adding *Limnæa peregra* from a ditch by the road, and so arrived at the station, where I took the train home, and thus concluded another ramble which, though unpromising at the beginning, ended very successfully, in the addition of two more habitats for this local shell.

[Read to the Leeds Conchological Club, 21st January 1899.]

VERNACULAR NAMES OF BIRDS AT STAVELEY, WESTMORLAND.

JOSEPH A. MARTINDALE,

Staveley, Westmorland.

The short article on Lakeland Bird-names in last month's 'Naturalist' interested me very much, and, if I may be allowed, I should like to say a few words on the same subject. Staveley may, I suppose, be considered to be within Lakeland, though three or four miles from the nearest lake; so that my remarks may be taken as supplementary to those of Miss Armitt. Like all other dialectal words and modes of speech, the local names for birds are gradually dying away under the influence of books. Boys are the great conservators of the local bird-names, and probably the inventors of several of them; but, even among them, there has been a great change during the last thirty years or so, and one finds them using book-names for such birds as the Barn Owl and Common Sandpiper, for which formerly they knew only the rustic appellations of 'Grey Hullet' and 'Willy Wittock.' Forty years ago, when I first settled in Staveley, comparatively few birds, with the exception of game, were known to school children by their ordinary English names; but the other day, when I asked some boys to write me out a list of all the wild birds of the neighbourhood, I was astonished to find them contain a majority of such names as Yellowhammer, Wren, Barn Owl, Sandpiper, and Swift.

In the 'sixties' no boy ever thought of calling the Wren anything else than 'Chitty' or 'Chitty-wĕrén.' The latter I always considered most interesting, as, in all probability, the only word anywhere spoken in England in which the sound of the letter *w* is given before an *r*. Miss Armitt's mode of writing the name disguises this, for the short indefinite vowel sound between the *w* and *r* is not at all truly represented by *ay*; neither is the name divisible into 'chittiwĕ' and 'ren,' but as I have written it above, 'chitty-wĕrén.' The vowel sound that comes between the *w* and *r* is that represented in Palæotype by an inverted italic e (ɐ). I regret to say that this name seems now obsolete in this neighbourhood, for, though 'chitty' appeared in some of the lists, not one boy could recollect hearing the full name.

Even in so small a district as Lakeland it is probable that no list of local names could be written that would be absolutely

correct for each part of it. Thus, though Miss Armitt says that 'Bessie Douker' is universal and the only name known for the Dipper, that bird was never called anything else here than 'Water Craa,' and the name is still generally used among boys, although I found 'Water Ouzel' put for it in one of the lists I spoke of. Again, the Grey Wagtail is most commonly known here as the 'Yellow Willy,' while its congener the Pied Wagtail is called the 'Grey Willy.' For the last bird the name 'Dish-washer' was given in one of the lists, but on questioning the boy who wrote it, he told me that the name was given to him by one of his playmates, a newcomer to the village, so that evidently it is an imported designation.

'Streä-smoor' used to be a name for the Whitethroat; and my son asserts that the 'Ground Lark' is the same as the Tree Pipit, though one would think the name more suitable to the Meadow Pipit. One must remember, however, that boys are by no means scientific in their ornithology, and that sometimes the same species bears two distinct names, while in other cases two or three distinct birds are lumped by them under one name; whenever, on the one hand, great variation of eggs and nesting place is found in the case of individuals of the same species, or, on the other, birds nearly resemble each other in appearance and there is no decided difference in the eggs and nest. The Long-tailed Tit is always called here 'the Long-tailed Chitteren Magpie'—all one name.

Among the Staveley bird-names not referred to above, or unmentioned in Miss Armitt's paper, are the following:—

'Bessie,' Yellowhammer.

'Grey Linnet,' Common Linnet.

'Yellow Linnet,' Greenfinch.

'Jammy' or 'Jammy Longlegs,' Heron.

NOTE—ORNITHOLOGY.

***Linota exilipes* at Skeffling, Holderness.**—Since writing (Nat., 1899, p. 35) the note in connection with two Mealy Redpolls shot at Skeffling on 30th December, Mr. Loten has kindly submitted the birds to me, and now that I have seen them, have not the least hesitation in referring them to the Arctic and circumpolar *Linota exilipes* Coues. This differs only from the Greenland, Iceland, and Spitsbergen *L. hornemanni* in being somewhat smaller. These Skeffling birds are identical in every respect with one from the same locality in 1894, which I sent to Mr. H. E. Dresser, and which was referred by him to *L. exilipes* (Nat., 1894, p. 84).

In my notes in 'The Naturalist,' 1899, p. 35, the date of the invasion of the Wood Pigeon is, by a clerical error, stated as '11th-12th December,' it should be '11th-12th January 1899.'—JOHN CORDEAUX, Great Cotes House, R.S.O., Lincoln, 8th February 1899.

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GEOLOGY AND PALÆONTOLOGY, 1894.

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For 1884,	in 'Naturalist,'	Dec.	1885, pp. 394-406.
,, 1885,	,,	Nov.	1886, pp. 349-362.
,, 1886,	,,	June	1888, pp. 178-188.
,, 1887,	,,	Feb.	1889, pp. 61-77.
,, 1888,	,,	April-May	1890, pp. 121-138.
,, 1889,	,,	Nov.	1890, pp. 339-350.
,, 1890,	,,	Oct.-Nov.	1891, pp. 313-330.
,, 1891,	,,	July-Aug.	1892, pp. 219-234.
,, 1892,	,,	Sept.	1893, pp. 265-279.
,, 1893,	,,	Sept.-Oct.	1898, pp. 273-296.

I have to thank Mr. W. Denison Roebuck, F.L.S., and Mr. Alfred Harker, M.A., F.G.S., for a considerable amount of assistance.

Particulars of papers, etc., omitted from the following list will be gladly received and included at the commencement of the 1895 Bibliography. Every effort will be made, however, to ensure these lists being as complete as possible.

The lists for 1895-1898 will be published as soon as possible, and it would render them more complete if editors of periodicals, secretaries of societies, and especially authors of papers in local journals, etc., would send copies to the editor of this journal at 259, Hyde Park Road, Leeds. Reprints and authors' separate copies should bear the name of the publication, the number of the volume or part, the *original* paging, and the *actual* date of publication.

The Watsonian vice-counties are adopted throughout these bibliographies as more convenient and uniform in extent than the political counties; those comprised within the North of England are the following:—

53, Lincoln S.; 54, Lincoln N.; 56, Notts.; 57, Derby; 58, Cheshire; 59, Lancashire S.; 60, Lancashire W.; 61, York S.E.; 62, York N.E.; 63, York S.W.; 64, York Mid W.; 65, York N.W.; 66, Durham; 67, Northumberland S.; 68, Cheviotland; 69, Westmorland with Furness and Cartmel; 70, Cumberland; and 71, Isle of Man; with their adjoining seas.

1890.

ROBERT MUNRO. YORK S.E.

The | Lake-Dwellings | of | Europe: | being the | Rhind Lectures in Archæology | for 1888. | by | Robert Munro, M.A., M.D. | . . . | . . . | . . . | . . . | 1890 | . . . | [the Holderness Lake-Dwellings described on pp. 469-474, and specimens therefrom figured]. pp. xl + 600.

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S. S. Buckman. York N.E.

Jurassic Ammonites: On the Genus *Cymbites* (Neumayr) [describing *Cymbites subcarinatus* (Young and Bird) from the Yorkshire Lias]. Geol. Mag., Aug. 1894, pp. 357-363.

F. M. Burton. Linc. N.

[Geological Observations made by] Lincolnshire Naturalists at Cleethorpes [on July 5th, 1894]. Nat., Dec. 1894, pp. 349-350.

F. M. Burton. Linc. N. and S.

[Geological observations made by the] Lincolnshire Naturalists' Union at Lincoln [on 24th May 1894]. Nat., Aug. 1894, p. 251.

JOHN BUTTERWORTH. LANC. S.

On some Coal Plants [from Lancashire; structure discussed and two figures given, but no names are supplied]. Sci. Goss., Sept. 1894, pp. 157-8.

W. LOWER CARTER. YORK S.E.

Notes on the Field Excursion [of the Yorkshire Geological and Polytechnic Society] for the examination of the Coast between Bridlington and Filey [describing the Sections in the Chalk and Glacial Beds examined 8th and 9th June 1894]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 421-423.

W. LOWER CARTER. YORK MID W., LANC. S

[Geological observations made by] Yorkshire Naturalists in Mid-Ribblesdale [between Sawley and Gisburn, 7th August, 1893]. Nat., Jan. 1894, pp. 10-11.

WILLIAM CASH. YORKSHIRE.

Obituary. James William Davis, F.G.S., F.L.S., F.S.A. [Points out the effect of Mr. Davis' influence on the progress of Yorkshire geology during his connection with the Yorkshire Geological and Polytechnic Society; gives 'List of Memoirs, Papers, etc., by James William Davis, F.G.S.,' enumerating 60 papers on various geological subjects, though principally having reference to the fossil fishes of the coal measures]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 4, 1894, pp. 319-334.

E. MAULE COLE. YORK S.E.

Huggate Dikes [(Huggate Dykes on cover of reprint); a description of the artificial entrenchments, presumably ancient British, which have been erected on the Chalk Wolds, near the village of Huggate]. Trans. East Riding Antiq. Soc., Vol. 2, 1894; reprint, paged 1-6.

E. MAULE COLE. YORK N.E., S.E.

Description of Photograph of Boulder Clay Cliffs, Carr Naze, Filey [describes the boulder clay and refers to its origin and contents; its characteristic weathering is well shown at Filey; a bed of Middle Calcareous Grit, upon which the boulder clay rests, forms the base of the section]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 442-446.

E. MAULE COLE. YORK S.E.

The Geology of Flamborough Head [with detailed sections of the Upper and Lower Cretaceous, and a geological sketch-map; pp. 102-108 of] Flamborough Village and Headland, 8vo., 1894, pp. xi. + 179, Hull.

G. C. CRICK. See 'Arthur H. Foord.' YORK S.W.

W. H. CROFTS. YORK S.E.

[Boulders at] Cottingham [etc.; in The Yorkshire Boulder Committee and Its Eighth Year's Work]. Nat., Oct. 1894, p. 302; and fuller particulars in Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 7.

HENRY W. CROSSKEY. CHESHIRE, LANC. S.

Introduction [to the late Carvill Lewis' 'Glacial Geology of Great Britain and Ireland'; speaking of the South Lancashire district (p. lii.), says: 'Under the guidance of a capable geologist, Mr. P. F. Kendall, F.G.S., I have examined the Ship Canal sections, and can come to no other conclusion than that the boulder clays, and at least a part of the sands, are the results of the *movement* of a great glacier which came from the north-west into the Irish Sea, carried the débris it there accumulated over the plains of Lancashire and Cheshire, and mixed it with locally derived material']. 1894, pp. xxxix.-lxxxi.

J. R. DAKYNS. YORK MID W.

Glacial Phenomena of Wharfedale between Bolton Abbey and Kettlewell [gives particulars of the striæ and glacial beds exposed in the

district; the latter contain pebbles of local rocks only; illustrated by two diagrams of the upper edges of rock being turned over by glacial action in the direction of the ice-flow, one of these at Gill Bank, near Storriths; the other at Barden Moor; in this district 'there is no evidence of foreign ice, but everything is in favour of huge confluent glaciers . . . . of home-made ice; Nidderdale, too, supports the same conclusion']. Proc. Yorks. Geol. and Polyt. Soc., 1894, Vol. 12, Part 4, pp. 299-305.

J. R. Dakyns. York N.W.

A Sketch of the Geology of Nidderdale and the Washburn North of Blubberhouses [gives detailed particulars of the various members of the Millstone Grit series; and refers to the geological features of the district generally]. Proc. Yorks. Geol. and Polyt. Soc., 1894, Vol. 12, Part 4, pp. 294-299.

W. Boyd Dawkins. Isle of Man.

"**On the Geology of the Isle of Man. Part 1, The Permian,** Carboniferous, and Triassic Rocks and the new Saltfield of the North" [description of the Palæozoic rocks in the vicinity of Peel, with diagrams and sections]. Trans. Manch. Geol. Soc., 1894, Vol. 22, Part 31, pp. 590-613.

W. Boyd Dawkins. Isle of Man.

The Carboniferous Limestone, Triassic Sandstone, and Salt-bearing Marls of the North of the Isle of Man [giving the results of several borings; the most interesting feature being the discovery of salt-measures connecting those of Ireland and Lancashire; the boulder clay near the Point of Ayre reaches the great thickness of 450 feet]. Geol. Mag. Dec. 1894, pp. 558-559; also Rep. Brit. Assn. for 1894, publ. 1895, pp. 662-663.

W. Boyd Dawkins. Isle of Man.

On the Permian Strata of the North of the Isle of Man [including the Peel Red Sandstones, 913 feet thick, and the calcareous conglomerates and breccias (=Magnesian Limestone) of the Stack, 455 feet; the area forms part of the same basin as N.E. Ireland and the Lake District]. Geol. Mag., Dec. 1894, pp. 560-561; also Rep. Brit. Assn. for 1894, publ. 1895, p. 662.

C. E. DeRance. Lanc. S. and Cheshire.

On the pre-Glacial Form of the Ground in Lancashire and Cheshire [attributing the carving out of the rock-valleys to pre-Glacial erosion when the land stood at least 300 feet higher than now]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 779-780.

C. E. DeRance. Yorkshire, Notts., and Lincolnshire.

The Circulation of Underground Waters.—Twentieth Report of the Committee . . [with particulars of borings at Worksop, Backwell, and several localities in Lincolnshire and Yorkshire]. Rep. Brit. Assn. for 1894, pp. 283-302.

C. E. DeRance. York S.W. and Mid W.

On the Glacial Sands and Gravels at Heck Station, Yorkshire [gives details of borings near Goole and Selby, as well as other particulars, from a paper by Dr. Parsons, contributed to the Geol. and Polyt. Soc. of the West Riding of Yorks. in 1877]. Glac. Mag., January 1894, pp. 131-134.

C. E. DeRance. Cheshire.

On the Boring for Coal in the Freeholders' Estate at Hazel Grove [details given of 1,633 ft. 2 in. of rock passed through]. Trans. Manch. Geol. Soc., Vol. 22, 1894, p. 452.

[G. E.] Dibley. York N.E.

A paddle of *Ichthyosaurus* from Whitby, with remains of the integument [exhibited at the meeting of the London Geologists' Association on 1st Dec. 1893]. Proc. Geol. Assn., 1894, Vol. 13, Part 6, p. 187.

JOSEPH DICKINSON. CHESHIRE.

Notes on Mr. De Rance's paper on "The Boring for Coal on the Freeholders' Estate at Hazel Grove" [with plan and section]. Trans. Manch. Geol. Soc., 1894, Vol. 22, Part 18, pp. 548-551.

E. DICKSON. LANC. S. AND W.

The Ribble Estuary, with Notes on the Formation of Sand and the disposal of Dissolved Matter in River Water [remarking on the excavations for the Preston Docks and giving a list of the various bones (*Urus*, etc.) found there; tracing some of the history of the river, and especially the changes in its channel during the last 200 years, as shown on various charts]. Proc. Liverp. Geol. Soc., 1894, pp. 135-154.

E. DICKSON AND P. HOLLAND. ISLE OF MAN.

Notes on Shell Breccia dredged off the Coast of the Isle of Man . . [about 25 miles from shore and in 25 fathoms; shells and shell fragments are contained in a sandy mass cemented by carbonate of lime]. Proc. Liverp. Geol. Soc., 1894, pp. 164-171.

A. R. D[WERRYHOUSE]. LANC. S., CHESHIRE.

Current Glacial Bibliography. Proceedings of the Liverpool Geological Society, Part 2, Vol. vii. [Gives summaries of several papers on the geology of the district around Liverpool]. Glac. Mag., Nov. 1894, pp. 71-75.

A. R. D[WERRYHOUSE]. NORTH OF ENGLAND.

Current Glacial Bibliography. Geological Magazine. Decade III., Vol. x., 1893. [Gives abstracts, etc., of papers bearing on glacial geology, several of which have reference to the North of England]. Glac. Mag., Feb. 1894, pp. 159-166; and March 1894, pp. 187-189.

F. W. FIERKE. YORK S.E.

The Mollusca [of Hornsea; records (p. 55) *Planorbis fontanus* (Lightfoot) from the Post-glacial lacustrine deposit exposed in the cliffs at Skipsea]. Fretwell's 'Illustrated Guide to Hornsea,' 8vo., 65 pp., Hull, no date [1894].

J. J. FITZPATRICK. WESTMORLAND.

The Permian Conglomerate of the Vale of Eden [describing the character and distribution of the well-known 'brockram;' specimens of pebble and matrix from Kirkby Stephen were found to be of limestone not dolomitised, the latter having 22 per cent. of siliceous matter; a specimen from Appleby, however, was partly dolomitised, with about 23 per cent of carbonate of magnesia, the insoluble residue of silica, etc., being about 30 per cent.]. Proc. Liverp. Geol. Soc., 1894, pp. 212-225 and plate.

ARTHUR H. FOORD AND G. C. CRICK. YORK S.W.

On *Temnocheilus coronatus*, M'Coy, from the Carboniferous Limestone of Stebden Hill, near Cracoe, Yorkshire [describing and figuring exceptionally good specimens of this nautiloid shell]. Geol. Mag., July 1894, pp. 295-298, and woodcut.

ARTHUR H. FOORD AND G. C. CRICK. ISLE OF MAN.

On the Identity of *Ellipsolites compressus*, J. Sowerby, with *Ammonites henslowi*, J. Sowerby [conclusions based on a specimen from the Isle of Man, in possession of Joseph Wright, Belfast]. Geol. Mag., Jan. 1894, pp. 11-17 (with plate).

C. LE NEVE FOSTER. ISLE OF MAN, ETC.

A Text-book of Ore and Stone Mining. 8vo. Griffin & Co., London. 1894. [Describes the Foxdale lode on pp. 335-338; also refers to Laxey, etc.]. **[Not seen].**

ARCHIBALD GEIKIE. NORTH OF ENGLAND.

Annual Report of the Geological Survey and Museum of Practical Geology for the year ending December 31st, 1893. 8vo. London. 1894.

JAMES GEIKIE. NORTHERN COUNTIES.

The Great Ice Age and its Relation to the Antiquity of Man. Third Edition, pp. xxviii + 850. Maps, charts, woodcuts, etc. London. 1894. **[Not seen;** Reviewed by G. J. H[inde] in Geol. Mag., Jan. 1895, pp. 29-38.

JAMES GEIKIE. NORTH OF ENGLAND.

The Great Ice Age, 3rd ed., largely rewritten, with maps and illustrations [containing in chapters 25, 26, an account of the glacial accumulations in Lincolnshire, Holderness, the North-Western Counties, the Trent Valley, etc.]. 8vo., pp. xxviii. + 850, with 17 plates, London, 1894.

GEOLOGICAL SURVEY OF ENGLAND AND WALES. DURHAM.

Horizontal Sections, Sheet 148 [Durham Coal-field].

GEOLOGICAL SURVEY OF ENGLAND AND WALES. YORK N.E., S.E.

General Geological Map of England and Wales (4 miles to an inch, hand-coloured edition), Sheets 3 (Index of Colours) and 6 (Yorkshire coast).

JOHN GERARD. LANC. S., YORK MID W.

Stonyhurst College [Geology on pp. 276-280, describing the Millstone Grit and Lower Carboniferous strata of the neighbourhood, and mentioning a number of fossils, including worm-tracks (*Chrossocorda* figured) and a rich collection of trilobites (*Phillipsia*); see H. Woodward below]. 4to., pp. 316, 1894, Belfast.

ELIZABETH OKE GORDON. ? NORTH OF ENGLAND.

The Life and Correspondence of William Buckland, D.D., F.R.S., sometime Dean of Westminster, twice President of the Geological Society, and First President of the British Association. 8vo. London. 1894 **[not seen].**

J. W. GRAY AND PERCY F. KENDALL. CHESHIRE.

On the Junction of Permian and Triassic Rocks at Stockport [combating the alleged unconformity]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 769 770.

G. C. GREENWELL, JUN. CHESHIRE.

Bitumen from a Coal Seam at Poynton, near Stockport [specimen exhibited and described at the meeting of the Manchester Geol. Society]. Trans. Manch. Geol. Soc., 1894, Vol. 22, Part 14, pp. 444-447.

J. W. GREGORY. NORTH OF ENGLAND.

[Review of] Man and the Glacial Period. By G. Frederick Wright, ... 8vo., pp. xiv., 385 pp. London . . . . . [This review principally deals with that part of the book referring to British Glacial Geology. which was written by Mr. P. F. Kendall]. Glac. Mag., July 1894, pp. 263-266.

J. W. GREGORY. YORK N.E.

Catalogue of the Jurassic Bryozoa in the York Museum [with figures of *Stomatopora* (*Cellaria*) *smithi* Phil., from the Cornbrash of Scarborough, and *Pustulopora* (*Millepora*) *straminea* Phil. from the Millepore Oolite of Gristhorpe; also noting without description a new species of the latter genus from the Millepore Oolite of Westow]. Ann. Rep. York Phil. Soc. for 1893, publ. 1894, pp. 58-61.

W. GREGSON. YORK N.W., N.E.

[Boulders at] Kirklington [and] Baldersby Village [etc. in The Yorkshire Boulder Committee and its Eighth Year's Work]. Nat., Oct. 1894, p. 301.

THEO. T. GROOM. YORK MID W.

The Effect of Faults on the Character of the Seashore [in Barn-staple Bay; a brief reference is made, pp. 364-5, to the joints, etc., on the plateaux round the base of Ingleborough]. Proc. Yorks. Geol. and Polyt. Soc., 1894, Vol. 12, Part 5, pp. 361-368, and plates 18, 19, and 20.

ALFRED HARKER. YORK S.E.

"Chapters in the Geological History of East Yorkshire" [a description of the probable aspects of East Yorkshire from Mesozoic times to the present day]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, pp. 18-24.

ALFRED HARKER. ISLE OF MAN.

The Foxdale Granite [a detailed petrological description of this grey muscovite granite]. Nat., March 1894, p. 68.

ALFRED HARKER. LAKE DISTRICT.

Cordierite in the Lake District [as imperfect crystals in the Skiddaw Slates metamorphosed by the granite of the Caldew valley in Cumberland]. Geol. Mag., April 1894, pp. 169, 170, and woodcut.

ALFRED HARKER. YORK S.E.

Norwegian Rocks in the English Boulder-Clays [summarising the evidence opposed to Sir H. Howorth's suggestion]. Geol. Mag., July 1894, pp. 334, 335.

ALFRED HARKER. YORK S.E.

Boulders of Elæolite-Syenite in East Yorkshire [recording the occurrence of that Norwegian rock as boulders on the beach at Dimlington]. Geol. Mag., Oct. 1894, pp. 477-478.

ALFRED HARKER. YORK S.E.

Sir H. Howorth on the Holderness Boulders [a reply to that author]. Geol. Mag., Dec. 1894, pp. 565-567.

ALFRED HARKER. LAKE DISTRICT.

Carrock Fell: a Study in the Variation of Igneous Rock-Masses. —Part I. The Gabbro [with a general sketch of the field-geology of the district; the gabbro shows many modifications, the most important kind of variation being from a quartz-gabbro with 59½ per cent. of silica in the central part of the intrusion to an ultra-basic iron-ore-gabbro with only 32½ per cent. at the margin]. Quart. Journ. Geol. Soc., Aug. 1894, pp. 311-336. pls. 16, 17. Abstract in Geol. Mag., June 1894, pp. 284-285.

ALFRED HARKER. LAKE DISTRICT.

On some Variolitic Rocks on Carrock Fell [describing the microscopic characters of some of the small dykes and veins on Carrock Fell]. Geol. Mag., Dec. 1894, pp. 551-553.

W. JEROME HARRISON. DERBYSHIRE, LINCOLNSHIRE.

On the | Search for Coal | in the South-East of England; with special reference to the probability of the | existence of a | Coal-Field beneath Essex. | — | by | W. Jerome Harrison, F.G.S., | . . . | . . . | — Birmingham: | . . . | 1894. [The earthquake of 22nd April 1884, and its effect upon Lincolnshire and Derbyshire briefly referred to].

W. HEMINGWAY. YORK S.W.

[Records of Boulders at] Staincross Station . . . East Gawber Colliery [etc., in The Yorkshire Boulder Committee and its Eighth Year's Work]. Nat., Oct. 1894, pp. 299-300.

W. A. HERDMAN. ISLE OF MAN, LANCASHIRE, AND CHESHIRE.

The Marine Zoology of the Irish Sea. Second Report of the Committee. . . . [The deposits on the floor of the Irish Sea are shown to be of great geological interest; results of dredging near the Isle of Man, etc., given]. Rept. Brit. Assn., 1894, pp. 318-334, pl. 1.

W. A. Herdman. Lancashire, Cheshire, and Isle of Man.

Notes on the Submarine Deposits of the Irish Sea [more or less pure quartz-sand predominates down to 10 fathoms; thence to 20 fathoms, sand becoming mixed with clay and diversified by shelly patches, gravels, etc.; deeper soundings occur only to the N., W., and S. of the Isle of Man, the proportion of mud to sand increasing down to 50 fathoms, beyond which is only dark bluish-grey tenacious mud]. Proc. Liverp. Geol. Soc., 1894, pp. 171-182.

Thomas Hick. York S.W.

On the primary structure of The Stem of Calamites [communicated by F. E. Weiss; observations based upon an exquisite series of sections prepared by Mr. James Binns, of Halifax]. Mem. and Proc. Manch. Lit. and Phil. Soc., 1893-4, Vol. 8, No. 3, pp. 158-170, plate.

T. Hick. York S.W.

On *Calamostachys Binneyana*, Schimp. [reviews the structure and affinities of this coal-measure plant in the light of more complete specimens (query, collected from the Halifax neighbourhood) placed at the author's disposal by W. Cash]. Proc. Yorks. Geol. and Polyt. Soc., 1894, Vol. 12, pt. 4, pp. 279-293, and two plates of sections.

Thomas Hick and James Lomax. Lanc. S.

On a New Sporiferous Spike from the Lancashire Coal Measures [from the Upper Foot Coal of the Lower Coal Measures at Moor Side, near Oldham—a bed practically identical with the Halifax Hard Bed; the specimen is referred to the *Calamarieæ*]. Mem. and Proc. Manch. Lit. and Phil. Soc., 1893-4, Vol. 8, No. 1, pp. 22-29, 4 figures.

Wheelton Hind. Northumb., Lancs., York Mid W., Derbyshire, Notts.

A Monograph on Carbonicola, Anthracomya, and Naiadites. Part 1, pp. 1-80, pl. i.-xi. [describing and figuring species of *Carbonicola* from various localities, the new species including *C. obtusa* from Oldham and *C. nucularis* from Wigan]. Palæontograph. Soc., 1894, Vol. 48.

G. J. H[inde]. York S.E.

[Review of] Ueber die Gliederung der Flötzformationen Helgolands. Von W. Dames. Sitzungsber. der k. preuss. Akad. d. Wiss. zu Berlin, 1893, pp. 1019-1039. (On the Divisions of the Stratified Formations of Heligoland. By Prof. Dr. W. Dames.) [Rocks of Lower Cretaceous age contain fossils similar to those of the Speeton Clay of Yorkshire, etc.]. Geol. Mag., Feb. 1894, pp. 84-85.

C. P. H[obkirk]. York Mid W.

Nidderdale and its Natural History. [Being a Review of Nidderdale | and the | Garden of the Nidd; | . . . by | Harry Speight . . . London. . . . 1894. . . .] Nat., Nov. 1894, pp. 334-336.

J. H. Howarth. York N.W.

The Yorkshire Naturalists' Union at Sedbergh [Geology]. Nat., July 1894, pp. 222-224.

Henry H. Howorth. York S.E.

The Most Recent Changes of Level and their Teaching. Part I. The Raised Beaches [suggesting that the Norwegian boulders on the Holderness coast may have been brought as ballast from Norway]. Geol. Mag., June 1894, pp. 257-263.

Henry H. Howorth. Isle of Man, York S.E., Lanc. S.

The Most Recent Changes of Level and their Teaching. The Rapid Collapse of some Districts at the Close of the Mammoth Age [the 'Irish Deer' remains in the Isle of Man, and the 'submerged forests' off the Yorkshire Coast, etc., briefly referred to]. Geol. Mag., Sept. 1894, pp. 405-413.

HENRY H. HOWORTH. YORK S.E

The Primitive Boulders of the Yorkshire Coast and their Lessons. A Reply to Two Critics [maintaining his suggestion of the artificial transport of the Norwegian boulders in Holderness and expressing doubt of their identity]. Geol. Mag., Aug. 1894, pp. 371-375.

HENRY HOWORTH. YORK S.E.

Mr. Harker and Mr. Deeley on the Scandinavian Ice-Sheet [continuing the same discussion]. Geol. Mag., Nov. 1894, pp. 496-499.

HENRY H. HOWORTH. LANC. S.

An Erect Tree in the Coal-Measures [a *Sigillaria* in the Lower Coal-measures in the valley of the Roach near Rochdale, with illustration]. Geol. Mag., Nov. 1894, pp. 527-528.

HENRY H. HOWORTH. YORK N.E. AND S.E., LINC. N.

The North Sea Ice Sheet [and explanation of occurrence of Norwegian boulders on the coasts of Yorkshire and Lincolnshire; suggests they have been transported as anchors by the Vikings]. Nature, 24th May 1894, p. 79.

WILFRID H. HUDLESTON. LINC. N. AND S., YORK N.E.

A Monograph of the Inferior Oolite Gasteropoda: Part 7, pp. 325- 390, Pl. 27-32 [describing and figuring numerous species, including new species as follows:—*Veritopsis incisa*, *Turbo lindecolinus*, *Delphinula alta-bicarinata*, *D. alta-acanthica*, *Trochus squamosior*, and *T. subluciensis*, var., all from Lincoln, *Ataphrus obtortus* from the Yorkshire Dogger, *Delphinula santonis* from Santon, and *Trochus vicinus* from Weldon]. Palæontograph. Soc., 1894, Vol. 48.

W. H. HUDLESTON. DERBYSHIRE, LAKE DISTRICT.

On Some Recent Work of the Geological Society. Part II. [a continuation of the subject of the preceding Anniversary Address; a summary of the work done by the Society]. Quart. Journ. Geol. Soc., May 1894, Vol. 50, Part 2, pp. 58-104.

WILFRID H. HUDLESTON. YORK N.E., LINC. N. AND S.

A Monograph of the British Jurassic Gasteropoda. Part I. No. 7. Gasteropoda of the Inferior Oolite [continued; describing and figuring species and varieties (some new) of *Onustus*, *Nerita*, *Pileolus*, *Neritopsis*, *Ataphrus*, *Turbo*, *Monodonta*, *Delphinula*, and *Trochus* from the Scarborough Limestone, the Dogger of Blue Wick, the Lincolnshire Limestone of Ponton and Weldon, and the 'Base-bed' at Lincoln]. Pages 325-390 and Pl. 27-32, Vol. 48 of the Palæontographical Society, 1894.

T. M. HUGHES. LINC. N. AND S.

"On Some Sources of Error in the Study of Drift" [points out that the boulders lying about on the surface of a district need not necessarily have been derived from the underlying beds, and, as an instance, states that a ship from Christiansund to Boston (Lincolnshire) was recently wrecked at Hunstanton, and the ballast, consisting of Norwegian porphyries, gneiss, etc., was strewn about on the beach]. Nature, 3rd May 1894, Vol. 50, pp. 5-6.

T. MCKENNY HUGHES. YORK MID W.

Caves and Cave Deposits [includes details of the Ingleborough Caves]. Proc. Chester Soc. Nat. Sci., No. 4, 1894, pp. 141 et seq.; reviewed in Nat., 1894, p. 241-2.

EDWARD HULL. LANC. S., CHESHIRE, ETC.

The Great Submergence [during the Glacial Period, defending this in reply to Mr. Lomas]. Glac. Mag., Feb. 1894, pp. 167-169, and April 1894, p. 208.

W. Fraser Hume. York S.E.

The Genesis of the Chalk [dealing principally with the Chalk of the South of England; on p. 219 are figured 'Sections representing the variations in thickness of the Upper Cretaceous Zones for some of the principal localities in the British Isles': the Yorkshire chalk is here divided as under:—*Marsupites* zone, 320 ft.; *Micraster* zones, 120 ft.; Barren zone, *Hol. planus* zone of Barrois, 50 ft.; *Terebratulina gracilis* and *Inoceramus labiatus* zones, 200 ft.; *Holaster subglobosus* zone, 100 feet; total 790 ft.]. Proc. Geol. Assn., 1894, Vol. 13, Part 7, pp. 211-246.

W. Maynard Hutchings. Cumberland, Westmorland.

Notes on the Composition of Clays, Slates, etc., and on some points in their Contact-Metamorphism [discussing especially the nature of the Coal-Measure clays from a boring at Aspatria, with six analyses; confirming the abundant formation of metamorphic felspar in the Coniston Flags near the Shap granite, and recognising the imperfect crystals in the 'spots' there as cordierite, not andalusite]. Geol. Mag., Jan.-Feb. 1894, pp. 36-45, 64-75.

W. Maynard Hutchings. Lake District.

Note on Sediments Dredged from the English Lakes [identifying the various mineral fragments found, which are mainly such as would be expected from the degradation of the old volcanic rocks; the deposit in Bassenthwaite, however, is chiefly derived from the Skiddaw Slates]. Geol. Mag., July 1894, p. 300-302.

A. Irving. Nottinghamshire.

Twenty Years' Work at the Younger Red Rocks [noting the unconformity of Upper Permian on Coal-Measures at Kimberley (with section), and contending for the origin of the Bunter pebble-beds as Triassic sand-banks formed in tidal seas]. Geol. Mag., Aug. 1894, pp. 363-368.

H. M. James. Cumberland.

Description of Whitehaven Collieries. Trans. Fed. Inst. Min. Eng., Vol. 7, 1894, pp. 641 et seq.

Osmund W. Jeffs. Cheshire.

On some Forms of Saurian Footprints from the Cheshire Trias [describing some impressions which the author considers should be accurately determined, and not included under the general term of 'Cheirotherian']. Rep. Brit. Assn., 1894, publ. 1895, pp. 658-659.

Osmund W. Jeffs. Lancashire, Cheshire.

Notes on the Geology of Hilbre Island [a brief description of the Triassic rocks exposed on this island; accompanied by a woodcut 'Section at Middle Eye, Hilbre Island'; the paper was read at a Field Meeting of the West Kirby Literary Society]. Birkenhead Advertiser, 4th June 1894 [also reprinted in pamphlet form].

Osmund W. Jeffs. Cheshire.

Notes on the Storeton Series of Footprints [description of slabs of Lower Keuper sandstone, with impressions of footprints of *Cheirotherium stortonensis*, *Rhynosaurus*, etc.; illustrated by 63 photos and Meissenbach plate]. Journ. Liverp. Geol. Assn., 1893-4, pp. 10-21; also reprinted in pamphlet form, 11 pp., under the title of 'Notes on a series of Fossil Footprints from Storeton, in Cheshire'—original pagination not indicated.

Osmund W. Jeffs, Secretary. North of England.

The Collection, Preservation, and Systematic Registration of Photographs of Geological Interest in the United Kingdom.—Fourth Report of the Committee . . . [recording the addition of 140 photographs, of which 35 are from the North of England: particulars given]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 473-482.

CUMBERLAND, WESTMORLAND, NORTHUMBERLAND,
OSMUND W. JEFFS [Secretary]. DERB., YORKSHIRE.

The Collection, Preservation, and Systematic Registration of Photographs of Geological Interest in the United Kingdom. Fifth Report of the Committee . . . [Records the addition of 215 photographs to the collection, several of which refer to Cumberland, Derbyshire, Northumberland, Westmorland, and Yorkshire]. Rep. Brit. Assn., 1894, publ. 1895, pp. 274-283.

OSMUND W. JEFFS. CHESHIRE.

On a Series of Saurian Footprints from the Cheshire Trias (with a Note on Cheirotherium) [describing a number of specimens from the well-known Storeton quarries]. Geol. Mag., Oct. 1894, pp. 451-454.

EDWARD JONES. YORK N.W.

The Investigation of the Cave at Elbolton. — Report of the Committee . . . [summarising the results: the floor has been examined to a depth of 60 feet, without finding any trace of Palæolithic man]. Rep. Brit. Assn. for 1894, publ. 1895, pp. 270-271.

E. JONES [Secretary]. YORK MID W.

Exploration of the Calf Hole Cave at the Heights, Skyrethorns, near Skipton. Report of the Committee . . . [the upper layers found to contain bones of sheep, horse, fox, badger, etc.; the lower bison, reindeer, roebuck, horse, and grizzly bear]. Rep. Brit. Assn. for 1894, publ. 1895, pp. 272-273.

T. RUPERT JONES. LAKE DISTRICT.

The Fossil Phyllopoda of the Palæozoic Rocks.—Tenth Report of the Committee . . . [The table of geological distribution of the Peltate Phyllopods gives *Aptychopsis anatina* from Ulverston; *A. lapworthi* from the Skelgill Shales; *A. angulata* from the Brathay Flags (?); *Peltocaris marrii*, *P. patula*, *Discinocaris browniana*, and *D. gigas* from the Skelgill Shales; and *Pinnocaris lapworthi* from Kendal]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 465-470.

T. RUPERT JONES [Secretary]. LANC. S.

Fossil Phyllopoda of the Palæozoic Rocks. Eleventh Report of the Committee, consisting of Professor T. Wiltshire (Chairman), Dr. H. Woodward, and Professor T. Rupert Jones (Secretary). [Reference is made to some very small *Estheria* from the Lower Coal Measures near Colne]. Rep. Brit. Assn., 1894, publ. 1895, pp. 271-272, and Geol. Mag., Dec. 1894, pp. 560-561.

T. RUPERT JONES. YORK N.E.

On the Rhætic and some Liassic Ostracoda of Britain [Yorkshire specimens briefly referred to]. Quart. Journ. Geol. Soc., May 1894, Vol. 50, Part 2, pp. 156-169.

A. J. JUKES-BROWNE. YORK S.E.

The Microscopic Structure of the Zones of the Chalk [a careful description of the various zones of the Chalk and their contents; and the irbearing on the origin of the deposits; the paper principally has reference to the Chalk of the South of England, 'The Chalk of Yorkshire' not having yet 'been sufficiently studied either in its zonal or structural aspects;' gives, p. 395, 'a diagram of the zones of the chalk as developed in the Isle of Wight']. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 385-395.

J. D. KENDALL. FURNESS.

A Short Description of the Hæmatite Deposit worked by the Salter, Eskett, and Winder Gill Mines, and the Method of Working it. Trans. N. Engl. Inst. Min. Eng., Vol. 43, pp. 444 et seq.; also Trans. Fed. Inst. Min. Eng., Vol. 7, pp. 650 et seq.

P. F. KENDALL. NORTH OF ENGLAND.

Geological Observations upon some Alpine Glaciers [comparing the Alpine glacial phenomena with the relics of the ancient glaciers of Britain]. Glac. Mag., Oct. 1894, pp. 43-50; Nov., pp. 63-68; Dec., pp. 83-90.

P. F. KENDALL. LANC. S., CHESHIRE, ISLE OF MAN.

The Levenshulme Section [etc.; and glacial sections exposed during the construction of the Manchester Ship Canal; fully described]. 'Appendix A' to the late Carvill Lewis' 'Glacial Geology of Great Britain and Ireland,' 1894, pp. 394-434.

PERCY F. KENDALL. ISLE OF MAN.

On the Glacial Geology of the Isle of Man [divided into thirteen chapters, viz.:—Introductory; Bibliography; Physical Geography and Geology; Transport of Local Stones; 'Aspect of the Crags'; Surface-features of the Drift-Deposits; the Glacial Striæ; the Origin of the Foreign Boulders; the Drift Deposits; Palæontology; Theories; Post-Glacial History; and Summary; illustrated by map and plates]. Yn Lioar Manninagh, Oct. 1894, pp. 397-438, with large folding map, plate of mollusca, and folding plate of sections.

P. F. KENDALL. YORK MID W.

"Man and the Glacial Period" [abstract of lecture to the Hull Geological Society; the Victoria Cave at Settle referred to and its evidence discussed]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, pp. 13-15.

P. F. KENDALL. ALL YORKSHIRE.

The Glaciation of Yorkshire [The ice from the Lake District down Teesdale to the North Sea was diverted southwards along the East Coast by the Scandinavian Ice-Sheet; a lobe of ice from Teesdale passed into the Vale of York and near York deposited two crescentic mounds--terminal moraines--upon one of which York is built; there is evidence that the Vale of York glacier overrode its own moraines; the outlines of these moraines are well shown on the coloured map which accompanies the paper]. Proc. Yorks. Geol. and Polyt. Soc., 1894, Vol. 12, Part 4, pp. 306-318.

CHESHIRE, DERBYSHIRE, LANCASHIRE,

P. F. KENDALL [Secretary]. ISLE OF MAN, YORKSHIRE.

Erratic Blocks of England, Wales, and Ireland. Twenty-first Report of the Committee . . . . . [with particulars of numerous erratics, especially from the Macclesfield district and the Dee estuary]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 514-523.

PERCY F. KENDALL. See 'J. W. Gray.' CHESHIRE.

P. F. K[ENDALL]. YORK N.E. AND S.E.

[Review of] The Jurassic Rocks of Britain. Vol. I., by C. Fox-Strangways [summarises that part of the work (Chapter 17) which refers to the scenery, denudation and glacial phenomena of the Yorkshire Wolds and the Vale of Pickering]. Glac. Mag., June 1894, pp. 249-250.

ROBERT KIDSTON. LANC. S.

"Notes on some Fossil Plants from the Lancashire Coal Measures" [specimens from Oldham, Bolton, Ashton-under-Lyne, etc., described and some figured; particulars of the 'Oldham Fossil Forest' section, prepared by George Wild, are included on p. 637]. Trans. Manch. Geol. Soc., 1894, Vol. 22, Part 21, pp. 632-652.

R. KIDSTON. NORTHERN COUNTIES, ETC.

On the Various Divisions of the British Carboniferous Rocks as determined by their Fossil Flora. Proc. Roy. Phys. Soc. Edin., Vol. 12, 1894, pp. 183 et seq.

G. W. LAMPLUGH. NORTH OF ENGLAND.

Notes upon the Snowfall of the Glacial Period [The amount of snowfall has more effect upon the growth of an ice-sheet than the severity of the cold; and it is suggested that the changes in the intensity and direction of flow of the ice which formerly covered parts of Britain may be accounted for in this way]. Glac. Mag., June 1894, pp. 231-233.

G. W. LAMPLUGH. YORK S.E.

Notes on the Coast between Bridlington and Filey [describing the sections in the Drift, Chalk, and Speeton Clay, splendidly exposed in the Cliffs]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 424-431 (with plan and section).

G. W. LAMPLUGH. NORTH OF ENGLAND.

Review [of] Papers and Notes on the Glacial Geology of Great Britain and Ireland. By the late Henry Carvill Lewis. . . . London. . . . 1894. Glac. Mag., Sept. 1894, pp. 23-27.

G. A. LEBOUR. NORTHUMBERLAND S.

Frost-Cracks and "Fossils" [notes of an observation made at Cullercoats]. Nature, 1st March 1894, p. 412.

G. A. LEBOUR. NORTHUMBERLAND S.

On certain Surface-Features of the Glacial Deposits of the Tyne Valley [pointing out that certain hollows resembling 'Kettle-holes' are being formed at the present time in glacial gravels between Riding Mill and Corbridge, by underground erosion (streams), and suggests that these cwm-shaped depressions do not afford positive proof of glacial action; also suggesting that arch-bedding in drift gravels may be caused by slipping due to the eroding action of water below ground]. Nat. Hist. Trans. Northumberland, Durham, Newcastle-upon-Tyne, Vol. 11, Part 2, 1894, pp. 191-195.

HENRY CARVILL LEWIS. NORTHERN COUNTIES.

Papers and Notes on the | Glacial Geology | of | Great Britain and Ireland | by the late | Henry Carvill Lewis, M.A., F.G.S. . . . | . . . Edited from his unpublished MSS. | with an introduction | By Henry W. Crosskey, LL.D., F.G.S. | . . . | London | . . . . | . . . . | 1894. [Several papers, hitherto published only in abstract, on the comparison of the glacial phenomena of Britain and America, the terminal moraines in the North of England, the evidence of 'extra-moraine' lakes in central England, etc.; together with extracts from the note-books of the late H. C. Lewis; there are also notes by the editor, H. W. Crosskey, and records of observations by P. F. Kendall]. 8vo., pp. lxxxi. + 469, with numerous maps and woodcuts.

JOSEPH LOMAS. CHESHIRE.

An Ancient Glacial Shore [combating Mr. Reade's view that the rolled clay-balls are a proof of shore conditions]. Geol. Mag., May 1894, pp. 222-223.

JOSEPH LOMAS. LANCASHIRE, CHESHIRE, YORKSHIRE, ETC.

The Great Submergence [discussing a paper by Prof. Hull which appeared in a previous issue]. Glac. Mag., 1894, pp. 134-137.

J. LOMAS. LANCASHIRE, CHESHIRE, ETC.

The Great Submergence [combating Prof. Hull's hypothesis of an extensive submergence in the Glacial Period]. Glac. Mag., March 1894, pp. 185-187; also May 1894, pp. 229-230.

J. LOMAS. WESTMORLAND.

Clay-balls in Drift Deposits [among gravel, in the banks of Hoff Beck, near Appleby]. Glac. Mag., April 1894, pp. 208-209.

JAMES LOMAX. See 'Thomas Hick.' LANC. S.

ARNOLD LUPTON. LINC. N., YORK S.W.

Some Notes on the Yorkshire Coalfield and its Eastwardly Extension [giving particulars of deep borings at Scarle, Carlton, and Haxey respectively; at the latter place a seam of coal, supposed to be the Barnsley Bed, was met with at the depth of 1,100 yards; thinks that before the present Yorkshire Coalfield is exhausted 'every seam of coal over 4 inches in thickness will be worked, and in many districts . . . the old wastes will be worked over again for the sake of the slack, the pillars, and beds of inferior coal that have not been considered good enough for the market (with plan and sections showing positions and depth of the different beds). Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 432-436.

A. LUPTON. YORK MID W.

Geology of the West Yorkshire Coalfield. Trans. Fed. Inst. Min. Eng., Vol. 7, 1894, pp. 137 et seq.; also Proc. Midl. Inst. Min. Eng., Vol. 13, 1894, pp. 215 et seq.

J. M. MAIN. CUMBERLAND.

The Working of Hæmatite in the Whitehaven District. Trans. Fed. Inst. Min. Eng., Vol. 8, 1894, pp. 31 et seq.

J. E. MARR. CUMBERLAND.

Notes on the Skiddaw Slates [with special reference to the Zones of graptolites; the following are recognised, in descending order:—Milburn Beds (=Uppermost Arenig or Lower Llandeilo); Ellergill Beds; *Tetragraptus* Beds (Upper, with *Didymograptus nanus,* and Lower); *Dichograptus* Beds; and *Bryograptus* Beds (=Tremadoc)]. Geol. Mag., March 1894, pp. 122-130, with woodcut.

J. E. MARR. LAKE DISTRICT.

Physiographical Studies in Lakeland. 1. Church Beck, Coniston [noting the occurrence of fragments of graptolite-bearing Skelgill Beds in gravel at Gill Head Bridge, considerably above the altitude of their outcrop in place, and offering an explanation; the Church Beck valley is supposed to have been converted into a lake by the barrier formed by the large Yewdale glacier]. Geol. Mag., Nov. 1894, pp. 489-492, with woodcut map.

J. E. MARR. LAKE DISTRICT.

Physiographical Studies in Lakeland. 2. Swindale [giving evidence that Mosedale once formed part of Wet Sleddale, and not, as now, of Swindale; the remarkable flat watershed now dividing Mosedale from Wet Sleddale was formed in a lake produced by the damming of the latter valley by ice, and the diversion of the Mosedale stream into Swindale was a result of the same cause]. Geol. Mag., Dec. 1894, pp. 539-545, with two woodcuts.

W. MAWBY. CHESHIRE.

On the Occurrence of Phosphate of Iron coating Sand Grains at Tranmere [noting Triassic sandstones locally coated with the rich blue vivianite]. Proc. Liverp. Geol. Soc., 1894, pp. 162-164.

HUGH ROBERT MILL. LAKE DISTRICT.

On a Bathymetrical Survey of the English Lakes [describing the types of lakes, and gives the length, breadth, depth, area, and volume of the principal Lake District waters]. Rep. Brit. Assn., 1894, publ. 1895, p. 713; also in Journ. Roy. Geog. Soc., Vol. 4, No. 3; Abstract in Glac. Mag., Sept. 1894, p. 40; Abstract also in Nature, 21st June 1894, p. 184.

HORACE W. MONCKTON. DURHAM.

[Note on Specimen of a Dyke from Croxdale Colliery, probably the Hett Dyke]. Quart. Journ. Geol. Soc., Feb. 1894, p. 3 of Proc.

HORACE W. MONCKTON. YORK N.E.

On a Variety of Ammonites (*Stephanoceras*) *subarmatus*, Young, from the Upper Lias of Whitby [shewing a peculiar arrangement of the costæ; abstract only]. Quart. Journ. Geol. Soc., Feb. 1894, p. 4 of Proc.; Abstract also in Geol. Mag., Feb. 1894, p. 91.

J. NICHOLSON. YORK S.E.

[Boulders at] Swine [in The Yorkshire Boulder Committee and its Eighth Year's Work]. Nat., Oct. 1894, pp. 302-303; and fuller particulars in Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 8.

OTTO NORDENSKJÖLD. LAKE DISTRICT.

"Ueber archæische Ergussgesteine aus Småland" [comparing (pp. 146-7) Smaland specimens with the rocks of the English Lake District]. Bulletin of the Geological Institution of the University of Upsala, Vol. 1, 1892-3, publ. 1894, pp. 133-255.

W. S. PARRISH. YORK S.E.

[Boulders observed on] the Yorkshire Wolds [a few igneous rocks only, which were very small and apparently not in situ]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 6.

H. M. PLATNAUER. YORK N.E., N.W., ETC.

Appendix to the List of Figured Specimens in the Museum of the Yorkshire Philosophical Society [supplying omissions in the former list and recording some new type specimens]. Ann. Rep. Yorks. Phil. Soc. for 1893, publ. 1894, pp. 46-56.

H. M. PLATNAUER. YORK S.E.

Borings made in the Neighbourhood of York [at Huby Burn Farm, at Huby, and near Raskelf Station; details given]. Ann. Rep. Yorks. Phil. Soc. for 1893, publ. 1894, pp. 56-57.

CHARLES POTTER. CHESHIRE.

"The So-called Forest Beds of Leasowe" [bringing evidence to prove that these beds do not contain remains of forest trees, etc., in situ]. Journ. Liverp. Geol. Assn., 1893-4, pp. 5-7.

ANDREW C. RAMSAY. NORTHERN COUNTIES.

The Physical Geology and Geography of Great Britain. 6th ed. by Horace B. Woodward, 8vo., pp. xv+421, with coloured map and numerous figures, London, 1894 **[not seen].**

T. MELLARD READE. LANC. S.

The High and Low Level Shelly Drifts around Dublin and Bray [briefly compared with the Lancashire drifts]. Irish Naturalist, June and July 1894, pp. 117-121 and pp. 150-153.

T. MELLARD READE. LANC. S.

The Dublin and Wicklow Shelly-Drift [briefly compared with the drifts of N. England]. Proc. Liverp. Geol. Soc., 1894, Vol. 7, pp. 183-206.

T. MELLARD READE. CHESHIRE.

An Ancient Glacial Shore [a deposit of shelly sand with rolled balls of clay, seen in a cutting of the Seacombe Branch of the Wirral Railway]. Geol. Mag., Feb. 1894, pp. 76-77.

F. R. COWPER REED. LAKE DISTRICT.

Woodwardian Museum Notes [describing a new species of trilobite, *Phacops* (*Chasmops*) *marri*, from the Coniston Limestone of Applethwaite Common, near Windermere]. Geol. Mag., June 1894, pp. 241-246.

A. von Reinach and W. A. E. Ussher. Nottinghamshire.

On the Occurrence of Fossils in the Magnesian Limestone of Bulwell, near Nottingham [including *Schizodus*, *Aucella hausmanni*, and probably other forms from the Upper Magnesian Limestone]. Rep. Brit. Assn. for 1893, publ. 1894, pp. 768-769.

R. Reynolds. York Mid W. and S.W.

[Obituary of] Thomas William Embleton [who was one of the founders of 'The Geological Society of the West Riding of Yorkshire,' and took an active part in the furtherance of geology –especially in reference to coal and coal-mining]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 4, 1894, pp. 335-339.

Sidney H. Reynolds. York N.W.

Woodwardian Museum Notes. Certain Fossils from the Lower Palæozoic rocks of Yorkshire [giving additions to the fossil lists from the *Phacops elegans* zone (Stockdale Shales) of Wharfe and the Coniston Limestone of Norber Brow and Wharfe, with descriptions of a new trilobite (*Dindymene hughesiæ*) and a new cystidean, *Ateleocystites* (?)]. Geol. Mag., March 1894, pp. 108-111, pl. 4 [also pl. 7, fig. 4, in June number].

J. F. Robinson. York S.E.

[Boulders at] Sutton on Hull [in The Yorkshire Boulder Committee and its Eighth Year's Work]. Nat., Oct. 1894, p. 303; and fuller particulars in Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 7.

Frank Rutley. Derbyshire.

On the Origin of certain Novaculites and Quartzites [Sections of a Magnesian Limestone, occurring in the Carboniferous Limestone Series; Cumberland Cavern, Matlock Bath, figured in illustration]. Quart. Journ. Geol. Soc., Aug. 1894, Vol. 50.

Frank Rutley. Westmorland.

On the Sequence of Perlitic and Spherulitic Structures: a Rejoinder to Criticism [maintaining the author's opinion that in the old rhyolite of Long Sleddale the spherulitic structure is of secondary origin and posterior to the perlitic cracks]. Quart. Journ. Geol. Soc., Feb. 1894, pp. 10-14, pl. 1.

G. Scoular. Cumberland.

Description of the St. Helen's Colliery, Workington. Trans. N. Engl. Inst. Min. Eng., 1894, Vol. 43, pp. 437 et seq.; also Trans. Fed. Inst. Min. Eng., 1894, Vol. 7, pp. 643 et seq.

A. C. Seward. Lanc. S.

On *Rachiopteris Williamsoni*, sp. nov., a New Fern from the Coal-Measures [described and identified as allied to the *Marattiaceæ*]. Ann. Bot., June 1894, Vol. 8, pp. 207-218, pl. 13.

A. C. Seward. Durham.

A New British Carboniferous Fossil [found by George Best in the Lower Carboniferous Measures Sandstone of Stainton Quarries, Barnard Castle; described and figured, its relationships discussed, and referred to *Fayolia dentata* R.&Z.]. Nat., August 1894, pp. 233-240, and plate.

A. C. Seward. York N.E.

Notes on the Bunbury Collection of Fossil Plants, with a list of type specimens in the Cambridge Botanical Museum [figuring *Protopteris* (*Klukia*) *exilis* Phill. from the Jurassic of the Yorkshire coast]. Proc. Camb. Phil. Soc., 1894, Vol. 8, Part 3, pp. 188-199.

W. Shone. Cheshire.

Subterranean Erosion and some of its Effects [discussing the phenomena of erosion carried on beneath a cover of boulder-clay]. Proc. Chester Soc. Nat. Sci., 1894, No. 4. pp. 252 et seq.

W. Shone. Lanc. S.

The Cause of Crateriform Sand Dunes and Cwms [see 1893 list]. Proc. Chester Soc. Nat. Sci., 1894, No. 4, pp. 263 et seq.

William Shone. Cheshire, Yorkshire, Lancs., Derbyshire.

Post-Glacial Man in Britain [discussing the relative position of Post-Glacial Man to Post-Glacial Geology, on the strength of evidence in Yorkshire, Cheshire, etc.]. Geol. Mag., Feb. 1894, pp. 78-80.

William Simpson. Lancs., Yorkshire, Derbyshire, Cheshire.

Notes on the Strata and Deposition of the Millstone Grit [classifying the beds as under: 1, Rough Rock or Topmost Rock, 2, Shales, 3, Middle Grits, 4, Shales, 5, Kinderscout or Lowest Grits; suggesting that all the beds of the series below the Kinderscout should be included amongst the Yoredales, and those above the Rough Rock with the Coal Measures; has reference to the Derbyshire, Lancashire, and Yorkshire areas only; refers to the probable origin of the materials composing the beds; illustrated by a 'Diagrammatic Section of the Millstone Grit of Derbyshire and the West Riding of Yorkshire']. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 407-420.

G. Slater. York Mid W. and S.W.

Impressions of the Science of Geology [refers chiefly to Yorkshire geology, and describes in a general way the flagstones around Leeds, the Carboniferous Limestone of the West of Yorkshire, etc.]. The White Rose, the Magazine of the past and present students of St. John's College, York, Vol. 3, No. 3, April 1894, pp. 43-46.

E. E. Speight. York Mid W.

Upper Wharfedale Exploration Committee. First Annual Report (1893) [gives lists of the articles discovered during the excavations of mounds, etc., near Grassington; these include numerous relics of British and Roman workmanship]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 374-384.

James Spencer. York S.W.

On the Geology of Calderdale [describing the sections in the Mountain Limestone, Yoredale Rocks, Millstone Grit and Coal Measures; and referring to the physical geography of the district; illustrated by a 'Diagram of the Strata of Calderdale']. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 369-373.

J. W. Stather [Secretary; not signed]. York S.E.

Report of the East Riding Boulder Committee, 1893-4 [details of boulders observed in different parts of the Riding by its members]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, pp. 6-8.

J. W. Stather. York S.E.

[Boulders at] North Cave [etc.; in] the Yorkshire Boulder Com- mittee and Its Eighth Year's Work. Nat., Oct. 1894, p. 302; and fuller particulars in Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 6.

J. W. Stather. York S.E.

[Geological Observations made by the] Yorkshire Naturalists' Union at Pocklington [6th Sept. 1893]. Nat., March 1894, pp. 66-67.

J. W. Stather. York S.E.

The Geology [of Hornsea, briefly describing the Glacial deposits and giving some particulars respecting the encroachment of the sea upon the coast-line; pp. 59-64 of] Illustrated Guide to Hornsea, 8vo., 65 pp., with map, etc; Hull, no date [1894].

D. S. Steuart. Derbyshire.

The Geology of Miller's Dale [Derbyshire]. Brit. Nat., 15th Jan. and 15th Feb. 1894, pp. 3-5 and 36-38.

WILLIAM STEVENSON. YORK S.E.

Ancient Forest Bed under the Town of Hull [a description of the photograph of the 'Ancient Forest Bed, Chalk Lane, Hull,' which appears as frontispiece to the volume]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 25.

MARK STIRRUP. YORK S.E.

A reply to Sir H. Howorth's Paper on "Recent Changes of Level" [combating the hypothesis of rapid subsidence in the case of the submerged forests at Hull]. Geol. Mag., Nov. 1894, pp. 502-505.

C. FOX STRANGWAYS. YORK N.E.

The Valleys of North-East Yorkshire and their Mode of Formation [a general sketch of the physical geography of the district, here divided into four areas, pointing out the mode of establishment of the drainage system and the causes by which this has since been modified, by thick masses of boulder clay, etc.; numerous cases of diversion of streams are pointed out and discussed]. Trans. Leicest. Lit. Phil. Soc., Vol. 3, Part 7, 1894, pp. 333-344, and large folding map.

C. FOX STRANGWAYS. YORK N.E.

Dr. Alex. Brown on *Solenopora* [pointing out that the *S. jurassica* found at Malton comes from the Corallian]. Geol. Mag., May 1894, p. 236.

ROBERT M. TATE. NORTHUMBERLAND S.

On the Erosion and Destruction of the Coast Line from the Low Lights to Tynemouth and Cullercoats during the last Fifty Years [at Percy Square, on the Tynemouth Coast, the cliffs have receded 180 feet, between 1827 and 1892; figures are given for other parts of the cliff, and suggestions made for protecting the coast]. Nat. Hist. Trans. Northumb. Durham and Newcastle-upon-Tyne, Vol. 11, Part 2, 1894, pp. 187-191.

THOMAS TATE. YORK S.W., N.W., N.E., S.E.

The Yorkshire Boulder Committee and Its Eighth Year's Work [includes reports by W. Hemingway, Thomas Tate, W. Gregson, J. W. Stather, F. F. Walton, Thomas Thelwall, W. H. Crofts, J. Nicholson, and J. F. Robinson]. Nat., Oct. 1894, pp. 297-303.

THOS. THELWALL. YORK S.E.

[Boulders at] Skidby and Little Weighton district [in] the Yorkshire Boulder Committee and Its Eighth Year's Work. Nat., Oct. 1894, p. 302, and fuller particulars in Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 7.

R. H. TIDDEMAN. YORK MID W.

The Occurrence of Limestone Conglomerates on the North Side of the Craven Faults [bringing evidence forward in support of a proposition which he had previously made that the 'Knowl Reefs' in the Carboniferous Limestone had been deposited in shallow water; this evidence is in the form of a limestone conglomerate recently seen at Dibbles Gill, near Grassington; points out that other proof may be brought to light in the excavations under Greenhow Hill, then being carried on for the Bradford Waterworks]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 437-440.

WARREN UPHAM. YORK MID W.

The Quaternary Epoch, and its division in the Lafayette, Glacial, and Recent Periods [the amount of denudation of limestone rocks on which drift boulders lie, in Yorkshire (? at Norber), referred to; and compared with similar evidence in other parts of the globe, from which the author estimates that the ice-sheets disappeared only 6,000 to 10,000 years ago]. Compte-rendu du Congrès Géologique International, 6e Session (Zurich), 1894, pp. 238-251.

WARREN UPHAM. NORTH OF ENGLAND.

Quaternary Time divisible in Three Periods, the Lafayette, Glacial and Recent [abstract; apparently a summary of the paper referred to above]. Proc. American Assoc. for the Advancement of Science, Vol. 43, 1894 (5 pp. reprint).

W. A. E. USSHER. See 'A. von Reinach.'

F. F. WALTON. YORK S.E.

[Boulders at] Newbald, South Cave [etc.; in] The Yorkshire Boulder Committee and Its Eighth Year's Work. Nat., Oct. 1894, p. 302; and fuller details in Trans. Hull. Geol. Soc., Vol. 1, 1893-4, p. 6.

F. FIELDER WALTON. YORK S.E.

Some New Sections in the Hessle Gravels [describing a series of angular gravels and blown sands banked up against the Pre-Glacial Chalk Cliff of Holderness Bay; both chalk and gravel are capped by a bed of Boulder Clay containing Scandinavian and other erratics; bones of horse and ox have been obtained from the gravels; illustrated by plan and section (p. 407)]. Proc. Yorks. Geol. and Polyt. Soc., Vol. 12, Part 5, 1894, pp. 396-406.

C. J. WATSON. NOTTINGHAMSHIRE.

The Hemlock Stone. Journ. Birm. N. H. Phil. Soc., Vol. 1, 1894, p. 29.

WILLIAM WATTS. LANC. S.

On Waterworks Construction and the use of Concrete and Earthwork informing Embankments [reference is made in the discussion which followed this paper to the suitability of local rocks for making concrete, etc.]. Trans. Manch. Geol. Soc., Vol. 23, Part 2, 1894, pp. 42-63.

WIILLIAM [sic] WATTS. LANC. S., YORK S.W.

"Septarian Nodules" [Notes on a septarian nodule exhibited at a meeting of the Manchester Geological Society, obtained from the Boulder Clay of the Piethorn Valley]. Trans. Manch. Geol. Soc., Vol. 22, Part 21, 1894, pp. 589-590.

W. W. WATTS. YORK S.E.

"Appendix on Some Boulders collected by Mr. Cameron" [comparing some specimens from Old Hurst, Hunts., with examples found at Bridlington by Lamplugh, and in Holderness by Harker, which are supposed to have been derived from the neighbourhood of Christiania]. Proc. Geol. Assn., Vol. 13, Part 9, 1894, pp. 359-360.

GEORGE WILD. LANC. S.

Presentation of Fossils [to the Manchester Museum, by Mr. Robert Cairns, of Hurst, Ashton-under-Lyne; including a large series of fish-scales, teeth, etc., and other fossils, from the Ashton Moss, Dukinfield, and Bardsley Collieries, and other places]. Trans. Manch. Geol. Soc., Vol. 13, Part 22, 1894, pp. 447-451.

T. R. WILLIAMS. YORK S.W.

"The Anthracite District of South Wales" [abstract of lecture delivered to the Hull Geological Society; analyses of Barnsley Coal and Anthracite given and compared]. Trans. Hull. Geol. Soc., Vol. 1, 1893-4, p. 17.

T. R. WILLIAMS. YORK S.E.

[Boulders at] Walkington [Micaceous Shale, Millstone Grit, and Shap Granite]. Trans. Hull Geol. Soc., Vol. 1, 1893-4, p. 7.

WILLIAM CRAWFORD WILLIAMSON. LANC. S., YORK S.W.

General, Morphological, and Histological Index to the Author's Collective Memoirs on the Fossil Plants of the Coal Measures. Part iii.

[Prefaced by a list of works on the organisation of the Fossil Plants of the Coal Measures and General Index to their contents; deals principally with the fossil ferns]. Mem. and Proc. Manch. Lit. and Phil. Soc., 1893-4, Vol. 8, No. 2, pp. 54-74.

W. C. WILLIAMSON. LANC. S.

On the Organisation of the Fossil Plants of the Coal Measures. Part xix. [*Oldhamia*, etc.]. Phil. Trans. Roy. Soc., Vol. 184B, 1894, pp. 1-38, pl. 1-9.

W. C. WILLIAMSON. LANC. S.

Correction of an Error of Observation in Part xix. of the Author's Memoirs on the organisation of the Fossil Plants of the Coal Measures. Proc. Roy. Soc., Vol. 55, 1894, p. 422.

W. C. WILLIAMSON and D. H. SCOTT. LANC. S.

The Root of *Lyginodendron Oldhamium*, Will. Proc. Roy. Soc. London, Vol. 51, 1894, p. 128.

ALBERT WILMORE. LANC. S.

Correspondence [a letter to the Editor of the Glacialists' Magazine recording some boulders in the district S.E. of Colne, and suggests that they may have been dispersed by small bergs in an extra-morainic lake]. Glac. Mag., Dec. 1894, pp. 105-106.

R. H. WILSON. LINC. S.

The Composition of the Fen Soils of South Lincolnshire. Chem. News, 28th Sept. 1894, Vol. 70, pp. 153-154.

N. H. WINCHELL. CHESHIRE.

Pebbles of Clay in Stratified Gravel and Sand [refers to a paper by T. M. Reade in the Geol. Mag. for February 1894; in which it is pointed out that boulders or pebbles of clay were found in a bed of sand in a railway cutting in the Wirral; from evidence of similar finds in America Prof. Winchell adds: 'The conclusion to be drawn . . . . is to admit that clay balls . . . . may be produced and embedded in gravel and sand which were the direct result of the wastage of the glacier, and that they are not unquestionable evidence of the former action of an oceanic shore line']. Glac. Mag., March 1894, pp. 171-174.

THOMAS WISE. LANC. S., ETC.

The Flora of the Carboniferous Period [a general summary with but little definite local application]. Rep. and Trans. Manch. Field Nat. Soc. for 1893, publ. 1894, pp. 75-80.

A. SMITH WOODWARD. YORK S.E.

On a Second British Species of the Jurassic Fish *Eurycormus* [from Peterborough; the first specimen, described by Sir Philip Egerton, under the name of *Macropoma egertoni*, is said to have been obtained from the 'Gault, Speeton']. Geol. Mag., May 1894, pp. 214-216.

A. SMITH WOODWARD. YORK S.E., LINC. N. AND S.

Notes on the Sharks' Teeth from British Cretaceous Formations [though no specimens from the North of England are referred to in this paper, the descriptions and illustrations of the Sharks' teeth are of considerable value to workers amongst the Cretaceous rocks of Yorkshire and Lincolnshire]. Proc. Geol. Assn., Vol. 13, Part 6, 1894, pp. 190-200, **and Plates 5 and 6.**

HENRY WOODWARD. YORK MID W.

Contributions to our knowledge of the Genus *Cyclus*, from the Carboniferous Formation of various British Localities [with woodcut of *C. woodwardi* Reed, from Settle]. Geol. Mag., Dec. 1894, pp. 530-539.

HENRY WOODWARD. LANC. S.

Note on a Collection of Carboniferous Trilobites from the Banks of the Hodder, near Stonyhurst, Lancashire [preceded by some remarks on the geological horizon of these fossils; two new species of *Phillipsia*, named *P. van-der-grachtii* and *P. polleni*, are described and figured]. Geol. Mag., Nov. 1894, pp. 481-489, Plate 14.

HORACE B. WOODWARD. YORKSHIRE.

Geology in the Field and in the Study [Yorkshire Geology briefly referred to]. Proc. Geol. Assn., Vol. 13, Part 7, 1894, pp. 247-273.

HORACE B. WOODWARD. LINCOLNSHIRE.

The Jurassic Rocks of Britain, Vol. IV. The Lower Oolitic Rocks of England (Yorkshire excepted) [treating the various subdivisions and their local variations as traced through England, with chapters on Scenery and Agriculture, Economic Products and Springs and Water supply, and an Appendix giving a Catalogue of Fossils]. Mem. Geol. Surv. England and Wales, pp. xiv. + 628, Plate 2, and 137 Figs. in text; London, 1894. [For review, see Geol. Mag., Nov. 1894, pp. 520-525.]

HORACE B. WOODWARD. See 'Andrew C. Ramsay.'

NOTE—ORNITHOLOGY.

Is the Missel Thrush Decreasing?—During the last few years this bird (*Turdus viscivorus*) seems to have become much less common at Garstang than was formerly the case, and I should like to ascertain if this is local or general. Some fifteen years ago every small plantation and every old orchard had one of the rather untidy nests of this bird placed in it, but now one rarely sees a bird and very few nests.—J. ARTHUR JACKSON, Elm Tree Road, Lymm Cheshire, 20th March 1899.

NOTE—BOTANY.

***Lobelia Dortmanna* in Lakeland.**—In 'The Naturalist' for January, page 4, under the heading of '*Lobelia Dortmanna*,' Mr. Wm. Hodgson, of Workington, says:—'With reference to the Blea Tarn mentioned in Mr. Baker's "Flora of the Lake District," pp. 142-3, I believe I am correct in referring it to a tarn of that name which lies in a secluded hollow under High Street, in Westmoreland.'

On reference to the map, I find that there is a Blea Tarn in Little Langdale where I have seen *Lobelia Dortmanna* growing in August 1891, and again in August 1895; a Blea Tarn, Watendlath; and a Blea Water (*not Blea Tarn*) under High Street. There is a point here that I should like to have cleared up. Mr. Baker, in his 'Flora of the Lake District,' mentions an Upper and Lower Tarn at Watendlath.

I judge, rightly or wrongly, that the Lower Tarn, in which *Lobelia Dortmanna* grows (see Baker's 'Flora,' p. 142, at the bottom of the page), is the tarn at Watendlath that goes by the name of the Watendlath Tarn.

Is the Upper Tarn the same as Blea Tarn, Watendlath, and if not, where is the Upper Tarn, Watendlath.

Baker gives as growing in the Upper Tarn, Watendlath, *Nymphæa alba* (p. 24 of the 'Flora'), *Myriophyllum spicatum* (p. 95 of the 'Flora'), and as growing by it, on the authority of Watson, *Scirpus pauciflorus* (p. 216-7 of the 'Flora'); also at p. 175, under *Littorella lacustris*, frequent up to 500 yards, among others, Blea Tarn, Watendlath. I have never been to Blea Water, High Street, nor to Blea Tarn, Watendlath, but I have been to Blea Tarn, Little Langdale, several times, and each time have seen *Lobelia Dortmanna* growing there.—CHARLES WATERFALL, 10, DeGrey Street, Hull, 9th February 1899.

NOTES MAMMALIA.

Cross between Hare and Rabbit.—Mr. Hawley has a stuffed specimen of this hybrid, between Hare (*Lepus europæus*) and Rabbit (*L. cuniculus*), and I have also one. As I spoke of this hybrid last year (1897), I need not say more now than that it was thought at first that the Hare and Rabbit, being so different in their habits, would not interbreed. On inquiry, however, I found that, not only were there several well-known single cases of their having interbred, but that the production of this cross had been carried on, rather extensively, for trading purposes, in France. I have shot five specimens of this cross on Kirkby Moor, and one has been seen there recently. J. CONWAY WALTER, Langton Rectory, Horncastle, 18th August 1898.

Fox and Dog Hybrids near Horncastle.—I exhibited, when the Lincolnshire Naturalists' Union met at Holbeck and Tetford, in August 1897, a case containing two stuffed specimens of a cross between a fox and dog, bred by Mr. Stafford Walker, of Horncastle, the sire being a male Fox (*Vulpes vulpes*) and the mother a half-bred bitch between Shepherd Dog and Whippet; of a litter of six only one survived. The mother was bought by the French savant, M. M. Suchetet, with a view to further experiments. Since then several similar hybrids have been produced in this neighbourhood. In one case, at Ashby Puerorum, a farm bailiff, named Cross, tied his Shepherd bitch near a fox-earth; and the one pup reared is now in the possession of Mr. Frank Dymoke, of Scrivelsby Park. In another case, a gamekeeper near Louth tied a bitch in a wood, in the nutting season, to give warning of trespassers, and subsequently the bitch had pups, evidently a cross with Fox. One of these is now in the possession of Mr. Waltham, dealer in china, High Street, Horncastle. Another is in the possession of Mr. E. Walter, farmer, of Hatton, a cousin of Mr. Stafford Walter, who bred the original hybrids, which I exhibited in 1897.

I mentioned that year that almost invariably in the case of hybrids the produce takes externally after the *male* parent. For instance, the progeny of a pure bred white Lincolnshire boar, from a black Berkshire sow, will all be white, or mainly so. A large breeder of Ducks in my own parish tells me that she last year reared more than 170 ducklings from three white ducks, by a Rouen drake, and that all were of the colour of the drake.

I have recently heard that a cross between a Merino ewe and a Southdown ram yields lambs with black points like the sire, though with the finer wool of the Merino, as a sort of compromise between the two.

Speaking of crosses, I may say that there is a living specimen at Horncastle of a cross between a tame Rabbit and a Guinea Pig; and I have recently heard of a supposed cross between Black Game and Grouse in Scotland, and also a cross between Black Game and Capercailzie.

And here I may mention a case, not exactly of cross, but of a curious mixture, which perhaps Mr. Hawley, or someone else, may be able to confirm. On one occasion, when shooting on Kirkby Moor, near Woodhall Spa, I shot a couple of the Common Brown Partridges (*Perdix perdix*), and a couple of the French Red-legged Partridges (*Caccabis rufa*), all in the same covey, and evidently consorting together as having been reared together. I happened to mention this to the late Mr. Stafford Hotchkin, of Woodhall, and he told me that he had known several cases—or at any rate more than one case—where the eggs of the two kinds had been found laid in the same nest. The eggs of the two birds are, of course, easily distinguishable, the Common Partridge egg being a greenish-drab and that of the Red-leg cream colour, with reddish-brown spots. Only night before last I saw the egg—a single one—of a Red-leg lying by a hedge bank, rather faded, but still spotted with pale brown. It had evidently been dropped here alone by the bird, and was doubtless addled. (I am told also by an authority that eggs of the Red-leg are sometimes found in the nests of outlying Pheasant. Confessions of an old poacher with whom I occasionally fraternise.)—J. CONWAY WALTER, Langton Rectory, Horncastle, 16th August 1898.

LINCOLNSHIRE COAST BOULDERS.

F. M. BURTON, F.L.S., F.G.S.,

Highfield, Gainsborough, Lincolnshire.

In my former paper on this subject in 'The Naturalist' for May 1898, p. 133, I invited information and discussion as to the possibility of these boulders being brought to the Lincolnshire coast from that of Holderness by what Mr. Harker—who seems partially, at all events, to entertain the view—calls 'the powerful tidal scour from N. to S.' In answer to this I have had two letters: one from Mr. W. H. Wheeler, M.Inst.C.E., of Boston, the other from Mr. A. Atkinson, A.M.Inst.C.E., of Brigg, both strongly against this view; and there has been a communication approving it from the Rev. H. E. Maddock, Patrington Rectory, which appeared on p. 245 of the current volume of 'The Naturalist.' To this note I need not specially allude, as all who take an interest in the subject can read it for themselves.

Before quoting from the letters referred to I will briefly give my own views for considering the theory of tidal action as being, not partially only, but altogether inadequate to account for the presence on the flat, sandy Lincolnshire coast of the boulders in question.

I have already in my previous paper shown that the boulder clay (from which deposit the stones are admittedly derived) lies all along this coast, and is exposed in various places on the land adjoining it near to where the stones occur: a fact which *does* account for their being found where they are; but besides this I would take ordinary reasonable grounds and ask how is it possible that the tidal current could carry heavy material with it down the shallow Lincolnshire coast against all the obstacles that oppose it? To begin with, starting from the north-east corner of the county, we have the large volume of water brought down by the Humber—which, at the least, would divert the action of the 'scour' for a considerable distance, and how can the boulders get—first across the strong rush of water flowing from the river, and then turn towards the land and hug the shore again? Surely great difficulties present themselves in the way of this hypothesis! Then, coming southwards down the coast, we have, successively, the rivers at Tetney Haven, Saltfleet, Wainfleet, with the Witham at Boston and the Fossdyke Wash, besides many minor streams

and outflows; all of which deposit in the aggregate vast tracts of mud and sand, covering up the shallow sea-bed and extending in places, as at Saltfleet, a mile or more out from the land; and in all this I fail to see any evidence of a 'powerful tidal scour' along the coast, which, if it existed, and was capable of transporting boulders along the shore, would surely be able to sweep away the soft deposits of mud and sand which encumber it.

It is not, however, with the present day only that we have to deal; we must go back to the time when the powerful stream of the Trent swept through the Lincoln Gap, where the Witham now flows, spreading the drainage of the Midlands over the shallow sea-bed, and irresistibly opposing any tidal current that could, on such a flat coast as that of Lincolnshire, be brought against it; and if it could be proved that this river was diverted from its course through the Gap before the Glacial period, when the boulder clay was deposited, it would make no difference, for, long after the Trent was captured and diverted it maintained its old course; indeed, it may fairly be said that it has not yet abandoned it, but—like the fitful outbursts of a dying-out volcano—it still, when recruited by rainfall in its upper reaches, overwhelms its banks, and once more asserts for a time a little of its old force and power, as the winter flood of two years ago testified when the land to the east of Lincoln resembled more an inland lake, or the bay of a sea, than a river's flood.

Let us turn now to the two letters I have referred to.

Mr. Atkinson writes (18th July 1898):—

'Mr. Harker's theory that these erratics may have been brought from the Holderness coast by the tidal scour is scarcely tenable. No doubt the action of the tidal drift is a very important one, but he has overlooked the existence of the wide and deep embouchure of the Humber. The Humber currents are tranverse to the general direction of the littoral drift, and probably interrupt its continuity for some distance from the shore.'

Mr. Wheeler, who, it is well known, has made tidal action his special study, deals more fully with the subject, and writes as follows (8th July 1898):—

'I have recently, in pursuit of my investigations into the matter of littoral drift, inspected the Yorkshire and Lincolnshire coast from Hornsea to Sutton. I was at Sutton soon after the great storm in March, which had in several places between Mablethorpe and Sutton bared the clay. I found several patches and small beds of stones. The conclusion I arrived

at was that these had been displaced from the boulder clay which underlies the sand. This bed of boulder clay extends over a large area of this part of the country. It underlies all the alluvial deposit at the mouth of the Witham and forms the bed of a great part of the east side of the Wash. I have frequently had to excavate into it, and when constructing the duct and outfall works had plenty of opportunity of making its acquaintance. It is full of fragments of rocks similar to those on the exposed beach at Sutton and Mablethorpe. I gave a description of it and of the rocks represented in my 'History of the Fens,' p. 456.

'I quite agree with you in rejecting the theory as to ballast. I am also of opinion that these stones have not come from the Holderness coast. There is no drift across the Humber. As to the "powerful tidal scour" suggested by Mr. Harker I do not know what this means. The only currents along this coast are those due to the tides, about two to three knots, and these currents are oscillating, and running for six hours one way and as many the other. There is, so far as I know, no regular current from N. to S. There is a drift of material along the beach from N. to S., but this all takes place landward of the point where the waves beat on the beach, and is due to wave action and not to currents. This drift collects at Spurn Point.'

Now, on referring to the chapter in Mr Wheeler's valuable work, which he calls attention to, I find the following:—

'The base or substratum of nearly the whole of the Fenland consists of Oxford and Kimmeridge clay. . . . Overlying this clay, throughout a considerable area, is a deposit known as the "boulder clay." This is an unstratified mass of lead-coloured clay, interspersed with fragments of chalk and lime-stone, and also with basalt, granite, sandstone, and other formations quite foreign to this part of the country. Many of these pieces of rock are polished and scratched, or striated, in a manner peculiar to stones which have been subject to glacial action. The following specimens of rocks were found by the author amongst the clay excavated for the new outfall of the river Witham and for the Boston Dock: red granite with large quartz crystals, grey granite, volcanic ash, amygdaloid, felstone, felspar, and quartz, porphyry, five different kinds of quartz rock, jasper, several different flints, ferruginous and argillaceous sand-stones, mountain limestone, dark blue silicious limestone with quartz veins, silicious, argillaceous, and carboniferous limestones, great oolite, iron ore, greensand, chalk; also ammonites of large

size, some having a diameter of more than a foot. In the excavation for deepening the upper Witham, some boulders of Lias limestone and sandstone were found, the largest of which was about 6 feet × 4 feet and 2 feet 6 inches deep, containing about 57 cubic feet.

'Many of the fragments of rock found in the boulder clay must have travelled very long distances, some from the North of England and Scotland, whilst some have been recognised as belonging to Norway; the rocks being thus pioneers of the Scandinavians who followed and settled here. The surface of the underlying strata, on which the boulder clay rests, is very uneven, and gives evidence of valleys, river-beds, and other depressions having been filled up by it. Large pot-holes, filled with gravel and sand, are frequently met with, and in many places this boulder clay rises up above the general level in the shape of mounds or hills, as at Sibsey, and at Beacon Hill, near Sleaford.'

This has a strong bearing on the point; but in a paper on 'The Action of Waves and Tides on the Movement of Material on the Sea Coast,' read by Mr. Wheeler—who is an acknowledged authority on the subject—at the late meeting of the British Association at Bristol—which paper has since received very favourable mention in the pages of 'Nature'—we find much that is more directly applicable to the question, and from this paper I must quote at some length:—

'*Wave action.*—With regard to wave action, whether due to winds or tides, although this is transmitted to the shore from the open ocean, the motion is only one of undulation, the particles of water rising and falling vertically, and having no forward motion beyond that which they perform in the orbit of the wave. When, however, the wave motion approaches the shallow water of the shore, and the depth is no longer sufficient for the free formation of the undulation, the lower particles being retarded by their contact with the shore, and the upper particles being also unable to complete their orbital course, are projected forward, and the motion becomes horizontal. The wave in this condition is capable of carrying forward any substance with which it comes in contact, and which is within the range of its energy, on to the beach and up its slope.'

'On a flat, sandy shore the water of the breaking wave is distributed over a wider horizontal range, and it comes in contact with the beach at a much greater angle than on a shingle bank. The force of the impact is therefore less, and

its effect on the beach less mordant. In this case nearly the whole of the energy of the wave is absorbed by the friction.'

'On flat, sandy shores, the waves first break seaward of the low water line, a succession of smaller waves following up to the margin of the water.'

'From the seaward side of the breaking point of the wave no material is carried shorewards on to the beach, the motion of the water continuing as an undulation.'

'It is stated that stones lying on the sea-bed are moved and displaced during heavy gales by the waves to depths of six or seven fathoms and even more. So long as these waves remain undulations, the movement cannot extend beyond the orbit of wave formation, and there cannot, therefore, be any translation of the stones shorewards.'

'In the formation of waves, besides the vertical movement of the particles of water which places the crest above the trough, there is an oscillating, horizontal movement, alternately towards and away from the shore. Any material susceptible of movement, lying on the bed of the sea, actuated by the waves, is moved alternately backwards and forwards, the mass of the substance and the distance over which it is moved depending on the height and on the length of the waves. As the places on which these waves act incline from the shore seaward, owing to the laws of gravity, the retrograde action of the wave must be most effective in the movement of material, and the tendency be rather to drag the material away from, than to push it towards the shore.'

'*Action of gravity.* As already pointed out, the slope of a beach is seaward.'

'By the law of gravitation, all material in movement has a natural tendency to work downwards unless prevented by some stronger opposing cause. Breaking waves no doubt have sufficient force, under certain conditions, to counteract this downward movement, but their general tendency is to aid the seaward movement by their undertow.'

'It is due to the seaward action of the undertow of the waves that bays and indents along the coast are kept open and free from accumulation of deposit.'

'It is true that stones and other substances of considerable size and weight, which have been buried in the sand for longer or shorter periods, are occasionally, in heavy gales causing high waves, lifted up, carried forward, and left stranded on the beach. These, however, are only rare and isolated events which occur during very heavy gales.'

April 1899.

'*Material of littoral drift.* The material may be classed as rock fragments, boulders, shingle, sand, and alluvial deposit.'

'*Sand.* The material next in size, or that generally known as sand, becomes distributed by the waves on the shore, where it is rolled backwards and forwards by the action of the tides; but, under the action of gravity, having a continuous downward movement until the shore assumes a slope of from 1 in 30 to 1 in 100, at which it attains a state of equilibrium.'

'Where there are no cliffs to supply fresh material, sand-beaches are not subject to littoral drift, and, except to the extent already mentioned, little or no change takes place in their condition. They generally extend out from the line of high water of spring-tides to that of low water at a very flat slope, beyond which the slope becomes steeper.'

'Thus, for example, on the east coast of England the drift from the material derived from the waste of the Yorkshire cliffs stops on the north side of the Humber. From the south side of that river to the Wash there extends for 25 miles a low tract of flat country, bordered by hills of blown sand. The beach consists of sand which extends out at a slope of about 1 in 30 to low water. On this beach there is no appreciable littoral drift or alteration in form. Sand does not accumulate against the piers or groynes which extend across the shore; and the general outline of the beach remains as it always has been so far as any record exists.'

'*Shingle.* The supply and movement of this material is of much greater interest than either that of sand or alluvial matter, inasmuch as where it is forthcoming shingle forms one of the most important aids to coast protection.'

'The supply of shingle is obtained from the destruction of cliffs consisting of granite and similar rocks or the hard, carboniferous shale, flints from the chalk cliffs, or boulders from the Glacial Drift.'

'Shingle, unlike sand, becomes heaped up in banks on the shore, and is found, with very few exceptions, accumulated in a zone lying between low water of neap-tides and high water of spring-tides. The exceptions to this rule are where the accumulation has become so great, as for example at Dungeness and the Chesil Bank, that the bank has been forced beyond the shore limits.'

The banking up of the shingle and also the travel along the shore is due entirely to tidal action.

'Frequently the shingle travels directly across a shallow bay, and several instances can be given where by so doing the shingle has formed a natural embankment.

As one example Mr. Wheeler gives 'that of Spurn Point, which consists of a spit of shingle, which extends southwards three miles, across the entrance to the Humber, the width of this bank being about 500 feet.'

'In some cases the shingle bank continues its course across the mouth of the river, causing the flood tide to take a considerable turn round the end of the shingle bank before it can enter the river. The case of the Humber, already referred to, affords an example of a spur or natural groyne being thus projected out from the coast.'

Space forbids my making further extracts, and it is difficult to make the argument plain by a selection of paragraphs. To be thoroughly understood and appreciated the paper itself should be read.

NOTES AND NEWS.

We are indebted to our old colleague, Mr. Edgar R. Waite, F.L.S., for various copies of Reports on the Trawling operations which were carried on off the coast of New South Wales about this time last year at the instance of the Colonial Government. The object of the Expedition was to find a good and cheap source of supply of food-fish for the colony, and our friend, Mr. Waite, was attached to the staff of H.M.C.S. 'Thetis' as a scientific investigator. Mr. Frank Farnell, the member of the Colonial Legislature at whose instigation the operations were undertaken, seems to be confident of its success from an economical point of view, but however this may be, there can be no doubt that Mr. Waite's share of the results will be of great value to science. His appendix to the Report includes a valuable and useful 'Descriptive List of Fishes,' with figures of many of them.

Naturalists who appreciate the great value of bibliography to all real workers will be glad to learn that Mr. W. Ruskin Butterfield, of St. Leonard's-on-Sea, the son of one of our most esteemed Yorkshire naturalists, has been entrusted by Dr. Elliott Coues, of Washington, with the task of completing his 'List of Faunal Publications relating to British Birds,' which was published in the second volume of the Proceedings of the U.S. National Museum, at pp. 359-482. Mr. Butterfield has favoured us with the sight of Dr. Coues' letters to him on the subject, and we are glad to note that he no longer wishes to draw the distinction originally contemplated between the 'faunal' and the 'systematic' departments of the bibliography, so that the result will be that Mr. Butterfield's work when completed will include the whole set of titles relating to British ornithology, and that these being given in strictly chronological order will show the progress of British ornithology in correct historical perspective. We wish Mr. Butterfield every success in his labours, and that he will find naturalists as willing to support this dry department of their subject as antiquaries are to encourage the publication of matter equally dry and equally valuable, in the form of reprints of parish registers. May we express one hope, that Mr. Butterfield will add to the value of his work by giving a concise summary of the scope of each paper, and even where needful give the names of the species mentioned.

NOTE—ORNITHOLOGY.

Unusual Nesting-Places of the Moorhen.—During my rambles in the past week I have come across the following curious (to me) places for nests of the Moorhen (*Gallinula chloropus*).

(1) The top of a small fir tree about seven feet high and about 100 yards from any water. This contains two eggs only, which the birds are sitting.

(2) In the very middle of a thick hawthorn bush overhanging a pond, about six feet from the water. This contained eight eggs.

(3) At the top of a fir tree, quite 14 feet from the ground and 20 yards away from any water; this containing nine eggs.

I do not know if this information will be of interest or not, but I have never found them in such positions before.—E. Banks, Saltmarshe, Howden, 5th May 1898.

NOTE—ANTHROPOLOGY.

Lake Dwellings at Pickering. The recently issued Journal of the Anthropological Institute (for August and November 1898) contains an interesting paper on 'Evidence of Lake Dwellings on the Banks of the Costa, near Pickering, North Riding of Yorkshire,' by Captain the Hon. Cecil Duncombe, F.G.S. It appears that whilst a stream was being cleared out in the spring of 1893, Mr. Mitchelson, of the Hall, Pickering, noticed some pieces of rude pottery had been thrown out. Other finds were made, and subsequently four rows of piles were discovered in the vicinity, crossing the Costa, at a distance of about 100 yards from each other. These rows of piles seem to converge upon a point forming the centre of a quasi island, which it is thought represents the site of a group of Lake Dwellings similar to those met with in Switzerland. Excavations were made near the piles, and after penetrating 8 to 10 inches of soil, 2 feet 6 inches of stiff blue clay, and 6 feet of peat, an immense accumulation of bones, broken pottery, etc., was met with, resting on the Kimmeridge Clay, which evidently formed the bed of the ancient lakes. Seeing that in one excavation enough bones were obtained to fill a cart, it would seem that a find of no mean importance has been made. The bones include those of man, deer (3 species), horse, *Bos longifrons*, sheep, goat, pig, wolf, fox, otter, beaver, voles ('different kinds'), and birds. The human bones consist of the remains of at least four individuals, and show that they were a short but muscular set of people. Neither stone nor metal instruments of any kind were met with, and the pottery is very thick and of a rude type. The dwellings are considered to be of very great antiquity (earlier than the Crannogs of Ireland and Scotland) and are referable to the same age as the Ulrome Lake Dwellings in Holderness; certainly in each case the remains are covered by an enormous accumulation of peat. The author discusses the probable origin and antiquity of these ancient Pickering settlers to some length. Unfortunately, however, there seems at present hardly sufficient data to work upon; nevertheless, it is remarkable that the human remains should resemble each other in having belonged to exceptionally small individuals. The skeleton of an adult female shows that she could not have exceeded 4 feet 6 inches in height when alive, 'and the owner of the largest thigh bone would not have exceeded 5 feet.' We should like to see the result of an examination of some human skulls from this place, and amongst future finds it is to be hoped some perfect ones may be secured. The paper is accompanied by a plate showing 'Fragments of coarse Pottery, and of antlers and limb-bones of Deer (*Cervus*); also perforated tines of antlers of Red Deer.' The finds are of great interest and we hope that Mr. Mitchelson and his friends will continue their investigations, especially towards the 'island'—the discoveries already made certainly warrant it. It should be stated that a short paper on the same subject, but dealing more particularly with the specimens collected, appears from the pen of Mr. J. Spink, in the 'Proceedings of the Yorkshire Geological and Polytechnic Society for 1895' (pp. 21-24).—T. Sheppard, Hull, 9th January 1899

LEPIDOPTERA NOTICED IN KILTON WOODS AND VICINITY DURING 1898.

T. ASHTON LOFTHOUSE,
Middlesbrough.

The following notes were made on the occasion of two or three visits paid to Kilton Woods in company with Mr. Sachse, of Middlesbrough.

Kilton Woods are situate in N.E. Yorkshire, near Loftus, and consist of richly-wooded valleys running from Skinningrove upward, and branching out at the upper part into three or four smaller valleys. The principal trees are Oak, Ash, and Wych Elm, interspersed with Mountain Ash and Bird Cherry, and close by the stream at the bottom of the valley Alders grow pretty freely; there are also some young plantations of Scotch Fir, Larch, Spruce, interspersed with Birch, etc.

Sugaring was only tried on two occasions and with very little success, the most of the collecting being done during the day time. Sugaring, I think, to be successful requires to be done for a few days consecutively, and this we had not the opportunity of doing.

The district not having been worked by Yorkshire lepidopterists, as far as we know, we have thought it advisable to give a list of all the species noticed.

11th June 1898. *Spilosoma mendica*, ♀ taken; *Cilix glaucata*; *Tephrosia biundularia*, a single specimen taken at rest on tree trunk; *Numeria pulveraria*, ♀ taken which laid ova, which hatched out on 26th June; *Hybernia defoliaria*, larvæ; *Cheimatobia brumata*, larvæ very abundant, stripping a great variety of trees, Maple especially suffering; *Abraxas sylvata* (=*ulmata*), plentiful and fresh out, sitting about on low plants underneath Wych Elm; some of the specimens were dark and nicely marked, but none so blue or suffused as specimens I have seen from the York district; this species was out in this locality for a great length of time, being noticed on the occasion of every visit up to and including 10th September; on the latter date larvæ were also abundant on Wych Elm in all stages of growth; *Melanthia albicillata*, single specimen taken, fresh out; also one or two full grown larvæ off Wild Rasp in September; *Coremia designata* (=*propugnata*).

30th July-1st August. — *Vanessa urticæ*; *Epinephele janira*; *Cœnonympha pamphilus*; *Lycæna icarus*; *Smerinthus populi*.

larvæ; *Hepialus hectus*; *Orgyia antiqua*, larvæ on bramble, perfect insect dashing about in sun on 10th Sept.; *Xylophasia monoglypha*, also at sugar on 10th September, when some of the specimens seemed to be quite fresh; *Agrotis exclamationis*, flying about in sun; *Triphæna pronuba*; *Aplecta nebulosa*, one worn specimen taken off tree trunk; *Plusia chrysitis*; *Plusia iota*, at light; *Zanclognatha grisealis*, beaten out of spruce; *Hypena proboscidalis*; *Rumia luteolata*; *Metrocampa margaritaria*; *Uropteryx sambucaria*, sparingly; *Amphidasys betularia* var. *doubledayaria*, a crippled ♀ taken which laid a large number of ova, which hatched out on the 17th August; *Boarmia repandata*; *Asthena luteata*, worn; *Asthena blomeri*, single specimen in good condition; *Eupisteria obliterata* (= *heparata*), worn; *Acidalia bisetata*; *Acidalia aversata*; *Cabera pusaria*; *Abraxas grossulariata*; *Lomaspilis marginata*; *Larentia didymata*, very abundant; *Larentia viridaria*; *Larentia olivata*, several specimens, but mostly worn; *Emmelesia affinitata* and var. *turbaria*; *Emmelesia alchemillata*, sparingly; *Eupithecia tenuiata*; *Thera variata*, also on 10th September; *Hypsipetes sordidata*, several, some very dark vars.; *Melanippe sociata*; *Melanippe montanata*; *Camptogramma bilineata*; *Cidaria truncata*, a few fresh out, common and variable in September, but much worn; *Cidaria populata*; *C. fulvata*; *C. dotata*; *Eubolia limitata*, common; *Anaitis plagiata*, one or two flying about in sun; *Tanagra atrata*; *Tortrix viridana*.

13th August.—*Pieris rapæ*; *P. napi*; *Polyommatus phlæas*; *Apamea didyma*; *Triphæna janthina*; *Plusia gamma*; also larvæ of *Acronycta rumicis*.

10th September.—*Pieris brassicæ*; *Vanessa atalanta*; *Phalera bucephala*, took a batch of larvæ off alder, very small for this late date, being barely half-an-inch long; *Hydræcia nictitans*; *Noctua glareosa*, at sugar; *Triphæna comes*; *Anchocelis litura*; *Calymnia trapesina*, caught; *Polia chi*; *Phlogophora meticulosa*; *Melanthia bicolorata*; *Hypolepia sequella*, two or three specimens.

NOTE—FISHES.

Enormous Skate. In Messrs. Clarke & Roebuck's 'Handbook of Yorkshire Vertebrata,' p. 102, mention is made, on my authority, of an enormous Skate (*Raja batis* L.), measuring 7 feet 2 inches in length and 5 feet 8 inches in breadth.

These dimensions are now greatly exceeded by one (a Blue Skate as the fishermen call them) brought into Grimsby this week by one of the boats fishing off Iceland. The length over all of this monster is 9 feet 4 inches and the breadth 6 feet 7 inches. I am told it is the largest ever seen on the pontoon.—J. CORDEAUX, Great Cotes House, R.S.O., Lincoln. **17th February 1899.**

Naturalist.

FLORA OF CUMBERLAND.

Flora of Cumberland | containing a full list of the flowering | plants and ferns to be found in the | county, according to the latest and most | reliable authorities, by | **William Hodgson** | of Workington | Associate of the Linnæan Society of London | and late Botanical Recorder to the Cumberland and Westmorland | Association for the Advancement of Literature and Science | with an **Introductory Chapter** | **on the Soils of Cumberland,** by | **J. G. Goodchild** | H.M. Geological Survey | of the Museum of Science and Art, Edinburgh | with a Map of the County | Carlisle | W. Meals and Company | 75 Scotch Street | 1898 [8vo. cloth, pp. xxxvi + 398 + folding map, price 7s. 6d. |.

The venerable author of the Flora of Cumberland is to be congratulated on at last seeing his volume through the press. It has been long and anxiously awaited, and I may add that six years ago I denied myself the pleasure of publishing a similar work because it was understood that everything which was of value for the historical portions of such an undertaking were in the possession of, or had been specially utilised by, Mr. Hodgson. It is therefore with mingled feelings that I take the volume in hand. No one more competent for the task could possibly be found, and the work has been a labour of love. It is impossible, however, to resist the feeling that, with such resources at his command, the author might have given us much more information. There is little or nothing in the volume to indicate that access had been obtained to special sources of information, and no attempt has been made to trace the history of botany in the county in a systematic and scientific way, or to supply a key to the dates at which first records were made respecting the more interesting plants. The list of plants and habitats is no doubt as full and perfect as present knowledge could make it, and certainly the author has been most careful to verify the records. My own copy of Baker's 'Flora of the Lake District,' which has been my constant companion for the last twelve years, and is profusely annotated with records for every part of the county, has been utilised by Mr. Hodgson to the full, and his tribute to the same is more than ample. But it would have been an immense boon to the student had the author, out of the mass of earlier material at his disposal, indicated when the species first came under notice. Some few records are quite modern, but many date back to the time of Bp. Nicolson and Thomas Lawson. Mr. Hodgson has prepared some excellent papers which have appeared from time to time in the 'Transactions of the Cumberland and Westmorland Association,' but we do not think he has embodied all the results of those productions in

the best possible way in his 'Flora.' He has disarmed criticism by allusion to the fact that the 'waifs' for which Silloth, Maryport, Workington, and other places are so famous, are incorporated under their proper orders in the text; but all students would have been glad if he had also printed one of his many valuable essays on the subject, with a full list of the 'waifs' which have been recorded, with indications of their native land, the explanation of their casual appearance in Cumberland, and notes on those which have temporarily or permanently gained a footing there. In the case of those plants at least which have not the slightest claim to be regarded as natives this would have been a decided advantage.

The Introduction and the very imperfect chapter on Deceased Botanists do not call for special remark. They add practically nothing to what Baker had already supplied, except that we have a short and welcome appreciation of Dr. Leitch, of Silloth, all too early removed from our midst, and the Rev. F. A. Malleson, who had nearly completed his fourscore years. For the Map, the essay on the soils of Cumberland by Mr. Goodchild, and its accompanying chart, we are very grateful. After all, the value of a work like this depends, not so much on the accuracy of the list of plants which a given district yields, as upon the helps it gives the student in solving the problems of distribution. Why is such a plant plentiful here and missing yonder? What light does this or that fact throw on the great problems of plant life? Such are the questions we want to answer. The days of the mere collector are numbered; records abound, but problems press for solution, and everything that helps towards their solution is welcome.

We cannot fail to regret that so competent an authority has not supplied us with at least an attempt at a bibliography of the Cumberland flora. No one has a fuller knowledge of the subject, and the nucleus was already to be found in the Lakeland Flora of Baker. Perhaps it is not too late to ask the veteran botanist to publish in 'The Naturalist' or elsewhere as complete a list as he can compile, as a starting point for the workers of the coming century. The volume covers 398 printed pages in addition to xxxvi. pages of introductory matter; is well printed and neatly bound, and betokens on every page honest and devoted toil. No price is anywhere affixed, and while the title page bears date 1898, we find 1899 on the cover. The book is one which it is in every way a pleasure to handle.

Ocker Hill, Tipton. Hilderic Friend.

MOSSES OF TADCASTER AND IMMEDIATE DISTRICT.

WILLIAM INGHAM, B.A.,

Organising Inspector of Schools, 47, Haxby Road, York.

I SEND this List, as it may prove useful to those botanists who attend the forthcoming Tadcaster Excursion of the Yorkshire Naturalists' Union.

The most interesting spot in this district is the Jackdaw Crag Quarry, close by Tadcaster. This is a very large and very old quarry on the magnesian limestone, with undulating bed and perpendicular cliffs.

I have visited this quarry six times during the last two years and I have found it a most interesting spot for bryologists to work, as the large number of Mosses in this List, from this quarry alone, will testify.

Near the entrance of the quarry the Deadly Nightshade (*Atropa Belladonna*) luxuriates.

Conchologists will also find this quarry interesting, for I saw here:—

Helix nemoralis. Of very large form.

Helix aspersa. In abundance.

Helix hortensis v. ***arenicola.***

Clausilia bidentata. Plentiful.

Clausilia laminata. Of large form.

On the face of the quarry, in the deep shady parts, the Hepatic,

Jungermania turbinata Raddi., fruits well, and covers the cliffs like a carpet.

I am much indebted to Mr. H. N. Dixon, M.A., F.L.S., for kindly verifying all doubtful Mosses in this List.

DICRANACEÆ.

Ditrichum flexicaule var. ***densum*** Braithw. J. C. Quarry, Tadcaster, June 1898.

Ceratodon purpureus Brid. J. C. Quarry, Tadcaster, June 1898.

Dicranella heteromalla Schp., the *male* plant. Church Fenton, May 1898.

Dicranella varia Schp. J. C. Quarry, Tadcaster, April 1897. Boston Spa, April 1897. Sherburn-in-Elmet, April 1897.

Dicranoweisia cirrata Lindb. Thorp Arch, April 1897.

FISSIDENTACEÆ.

Fissidens bryoides Hedw. Church Fenton, February 1897. Sherburn-in-Elmet, December 1898.

Fissidens decipiens DeNot. J. C. Quarry, Tadcaster, April 1897. Sherburn-in-Elmet, January 1898.

Fissidens taxifolius Hedw. Sherburn, January 1898.

GRIMMIACEÆ.

Grimmia apocarpa Hedw. Sherburn, December 1897.

Grimmia pulvinata Sm. J. C. Quarry, Tadcaster, June 1898.

TORTULACEÆ.

Phascum cuspidatum Schreb. J. C. Quarry, Tadcaster, April 1897 Boston Spa, April 1897. Sherburn, January 1898.

Phascum curvicolle Ehrh. Sherburn, April 1897.

Pottia recta Mitt. Sherburn, January 1898.

Pottia bryoides Mitt. Sherburn, January 1898. J. C. Quarry, Tadcaster, January 1898.

Pottia Heimii Fürnr. Thorp Arch, April 1897.

Pottia truncatula Lindb. J. C. Quarry, Tadcaster, January 1898. Appleton Roebuck, December 1898.

Pottia intermedia Fürnr. Intermediate between this species and *P. truncatula*. Sherburn, January 1898.

Pottia minutula Fürnr. Sherburn, January 1898. J. C. Quarry, Tadcaster, January 1898.

Pottia lanceolata C.M. J. C. Quarry, Tadcaster, January 1897.

Tortula pusilla Mitt. Barkstone, February 1897. Sherburn, April 1897.

Tortula lamellata Lindb. Sherburn, January 1897.

Tortula brevirostris H.&Grev. Sherburn, April 1897.

Tortula rigida Schrad. Sherburn, April 1897.

Tortula ambigua Angstr. Barkstone, February 1897. Sherburn, January 1898.

Tortula aloides DeNot. J. C. Quarry, Tadcaster, January 1898.

Tortula marginata Spr. Sherburn, September 1897,

Tortula muralis Hedw. J. C. Quarry, Tadcaster, April 1897.

Tortula subulata Hedw. J. C. Quarry, Tadcaster, January 1898.

Tortula intermedia Berk. J. C. Quarry, Tadcaster, April 1897.

Barbula lurida Lindb. Boston Spa, April 1897.

Barbula rubella Mitt. J. C. Quarry, Tadcaster, January 1898. Bramham, June 1897. Sherburn, January 1898.

Barbula fallax Hedw. Sherburn, January 1898. J. C. Quarry, Tadcaster, January 1898.

Barbula fallax v. ***brevifolia*** Schultz., c.fr. Sherburn, April 1897.

Barbula rigidula Mitt. J. C. Quarry, Tadcaster, April 1897.

Barbula cylindrica Schp. J. C. Quarry, Tadcaster, January 1898.

Barbula revoluta Brid. J. C. Quarry, Tadcaster, June 1898. Sherburn, January 1898.

Barbula convoluta Hedw. J. C. Quarry, Tadcaster, June 1898. Sherburn, January 1898.

Barbula unguiculata Hedw. J. C. Quarry, Tadcaster, April 1897. Sherburn, April 1897.

Weisia squarrosa C.M. Sherburn, January 1898; verified by Mr. Dixon.

Weisia microstoma C.M. Aberford, June 1897. Sherburn, January 1898. J. C. Quarry, Tadcaster, April 1897.

Weisia viridula Hedw. J. C. Quarry, Tadcaster, April 1897.

Weisia tenuis C.M. Boston Spa, April 1897.

Trichostomum crispulum Bruch. J. C. Quarry, Tadcaster, January 1898.

Trichostomum crispulum v. ***viridulum.*** J. C. Quarry, Tadcaster, September 1897.

Trichostomum mutabile Bruch. J. C. Quarry, Tadcaster, January 1898.

Trichostomum tortuosum Dixon. A very tall and highly tomentose form, J. C. Quarry, Tadcaster, September 1897.

ENCALYPTACEÆ.

Encalypta streptocarpa Hedw. J. C. Quarry, Tadcaster, April 1897.

ORTHOTRICHACEÆ.

Zygodon viridissimus R.Br. J. C. Quarry, Tadcaster, June 1898.

Orthotrichum anomalum v. ***saxatile*** Milde. Barkstone, May 1898. J. C. Quarry, Tadcaster, April 1897 (abundant in this quarry).

Orthotrichum cupulatum Hoffm. v. ***nudum*** Braith. Boston Spa, April 1897.

Orthotrichum leiocarpum B.&S. Barkstone, May 1898.

Orthotrichum affine Schrad. J. C. Quarry, Tadcaster, April 1897. Barkstone, December 1896.

Orthotrichum diaphanum Schrad. Boston Spa, April 1897. Barkstone, December 1896. J. C. Quarry, Tadcaster, April 1897.

FUNARIACEÆ.

Funaria hygrometrica Sibth. J. C. Quarry, Tadcaster, January 1898. Barkstone, May 1898, a very tall form. Thorp Arch, April 1897.

BRYACEÆ.

Webera carnea Schp. Boston Spa, April 1897.

Bryum pendulum Schp. J. C. Quarry, Tadcaster, April 1897.

Bryum pallens Sw. Boston Spa, April 1897.

Bryum intermedium Brid. Sherburn, January 1898. J. C. Quarry, Tadcaster, September 1897.

Bryum cæspiticium L. Aberford, June 1897.

Bryum capillare L. Barkstone, May 1898. Bramham, June 1897. J. C. Quarry, Tadcaster, September 1897.

Bryum argenteum L. Sherburn, January 1898. J. C. Quarry, Tadcaster, January 1898.

Mnium undulatum L. J. C. Quarry, Tadcaster, April 1897.

Mnium cuspidatum Hedw. Sherburn, April 1897.

Mnium rostratum Schrad. Sherburn, c.fr., April 1897.

Mnium serratum Schrad. Boston Spa, c.fr., April 1897.

FONTINALACEÆ.

Fontinalis antipyretica L. Saxton, May 1897.

Fontinalis antipyretica v. ***gigantea*** Sull. Saxton, May 1897.

NECKERACEÆ.

Neckera crispa Hedw. J. C. Quarry, Tadcaster, January 1898.

Neckera crispa v. ***falcata*** Boul. J. C. Quarry, Tadcaster, January 1898.

Neckera complanata Hübn. Sherburn, December 1897. J. C. Quarry, Tadcaster, April 1897.

LESKEACEÆ.

Leskea polycarpa Ehrh. J. C. Quarry, Tadcaster, April 1897.

Anomodon viticulosus H.&T. J. C. Quarry, Tadcaster, April 1897.

Thuidium tamariscinum B.&S. Sherburn, December 1897. J. C. Quarry, Tadcaster, September 1897.

HYPNACEÆ.

Pleuropus sericeus Dixon. J. C. Quarry, Tadcaster, September 1897.

Brachythecium rutabulum B.&S. Sherburn, December 1897. J. C. Quarry, Tadcaster, April 1897. Barkstone, May 1898.

Brachythecium velutinum B.&S. Sherburn, January 1898. J. C. Quarry, Tadcaster, April 1897.

Brachythecium purum Dixon. J. C. Quarry, Tadcaster, January 1898.

Eurhynchium piliferum. Sherburn, January 1898. Bolton Percy, March 1898.

Eurhynchium speciosum Schp. Ulleskelf, December 1897.

Eurhynchium prælongum. Barkstone, May 1898. J. C. Quarry, Tadcaster, a very robust form, April 1897. Ulleskelf, May 1898. Sherburn, December 1897.

Eurhynchium Swartzii Hobk. Boston Spa, a large form, April 1897. Ulleskelf, a brown form, December 1897. Bramham, a yellow form, December 1897. Barkstone, May 1898. J. C. Quarry, Tadcaster, June 1898, a very *glossy* form, and another, a very unusual large form. Sherburn, January 1898.

Eurhynchium tenellum Milde. J. C. Quarry, Tadcaster, September 1897.

Eurhynchium striatum B.&S. Sherburn, December 1897. J. C. Quarry, Tadcaster, June 1898.

Eurhynchium rusciforme Milde. Saxton, May 1897.

Eurhynchium murale Milde. J. C. Quarry, Tadcaster, April 1897. Sherburn, September 1897, a form very near v. *julaceum* Schp. J. C. Quarry, June 1898.

Eurhynchium confertum Milde. Boston Spa, April 1897. Barkstone, December 1897. Sherburn, Dec. 1898. J. C. Quarry, Tadcaster, January 1898.

Amblystegium serpens B.&S. J. C. Quarry, Tadcaster, April 1897. Sherburn, January 1898. Church Fenton, May 1898. Barkstone, May 1898.

Amblystegium Juratzkæ Schp. Sherburn, c.fr., May 1898. J. C. Quarry, Tadcaster, c.fr., June 1898. Appleton Roebuck, c.fr., May 1898. All these have been confirmed by Mr. Dixon.

Amblystegium varium Lindb. Ulleskelf, June 1897.

Amblystegium filicinum DeNot. Saxton, May 1897. J. C. Quarry, Tadcaster, April 1897. Barkstone, May 1898.

Amblystegium Kochii B.&S. Sherburn, c.fr., May 1898. J. C. Quarry, Tadcaster, June 1898.

Hypnum riparium L. Saxton, 1897. J. C. Quarry, Tadcaster, April 1897.

Hypnum stellatum Schreb. J. C. Quarry, Tadcaster, September 1897.

Hypnum stellatum v. ***protensum*** B.&S. Sherburn, September 1897. J. C. Quarry, Tadcaster, April 1897, abundant.

Hypnum chrysophyllum Brid. Bramham, December 1897. J. C. Quarry, Tadcaster, April 1897.

Hypnum Sommerfeltii Myr. Thorp Arch, April 1897.

Hypnum cupressiforme L. J. C. Quarry, Tadcaster, April 1897. Sherburn, December 1897.

Hypnum cupressiforme v. ***resupinatum*** Schp. Sherburn, December 1897.

Hypnum molluscum Hedw. Bramham, December 1897. Sherburn, September 1897. J. C. Quarry, Tadcaster, September 1897.

Hypnum palustre L. Sherburn, December 1897. J. C. Quarry, Tadcaster, January 1898. Boston Spa, April 1897.

Hypnum cuspidatum L. Bramham, December 1897. J. C. Quarry, Tadcaster, c.fr., June 1898. Sherburn, January 1898.

Hylocomium splendens B.&S. J. C. Quarry, Tadcaster, April 1897.

Hylocomium squarrosum B.&S. Sherburn, December 1897. J. C. Quarry, Tadcaster, April 1897.

Hylocomium triquetrum B.&S. J. C. Quarry, Tadcaster, January 1898.

NOTE—ORNITHOLOGY.

Little Gull on the Tyne.—One of these rare birds (*Larus minutus*) was shot here on 26th January. It is curious to note that whenever they have occurred here during recent years it has always been during the month of January.—H. T. ARCHER, Newcastle-on-Tyne, 28th Feb. 1899.

PLANT-NAMES IN USE AT WEST AYTON, YORK N.E.

Rev. W. C. HEY, M.A.,
West Ayton, York.

Some months ago I sent a few notes to 'The Naturalist' on the bird-names in use at West Ayton, and they elicited several very interesting communications from observers in other parts of the country. I now contribute some notes on the plant-names in use at the same village.

To begin with the trees, the Ash is called 'Esh,' the Alder 'Eller,' and the Oak 'Yak.' There is, however, in Forge Valley a very conspicuous ancient Alder which is widely known as 'Jack o' Lamb's Plane.' It is handed down to posterity that this tree grew from the walking stick of the above-named individual, and it must be admitted that the perfect straightness of its trunk distinguishes it in the most marked manner from every other Alder in the neighbourhood. Perhaps some etymologist can say whether the name Ayton means Oaktown. I suppose that such is no doubt the derivation of Aysgarth. Elder is called 'Bottery.' You seldom hear the word used alone. The people speak of a 'Bottery-bush' or a 'Bottery-beöf.' Is the word a corruption of Bower-tree, because the tree was often used to form arbours? The Mountain Ash is called 'Witch-wood,' and its value as an antidote to witchcraft is still well remembered, if no longer put to actual test. I asked a village lad the other day if he could tell me anything about witches. He replied, 'You want to get Witch-wood, and put salt on the lintels of the windows.' Then he added in a very diffident tone, 'But there aren't such things, are there?'

Very few flowering plants have obtained local names. Wood Anemones, which carpet the valleys here in spring, are called 'Gammy Nightcaps.' The Ragwort (*Senecio Jacobæa*) goes by the name of 'Segrams.' The people say that a field in which horses are pastured will soon be overrun with it, but that sheep rapidly eradicate it. *Bunium flexuosum* is called 'Yennuts' (Earth-nuts). The children dig up the bulbous root and eat it. All the tall white Umbelliferæ are dubbed 'Humlocks,' and regarded with aversion. *Allium ursinum* is called 'Rams.' Pastures near woods are not liked for cows, as this herb is said to spoil the milk. Wild Cabbage is called 'Brassies,' which can hardly be a very old name. Wild Plums are 'Bullaces.' A well-polished boot or fire-grate is said to be 'As breet as a Bullace.'

April 1899.

Mr. Blakeborough, in his new book on North Yorkshire, informs us in the glossary under 'Bullace' that the Bullace is a 'Wild Plum of a green colour when ripe.' To me they appear to be purple-black. The same author informs us that 'Wicks' are 'seedlings of the Whitethorn.' I never heard the term applied to anything but the long running roots of grasses which cause such trouble in arable land.

Pteris aquilina is called 'Breckans,' and is not considered to be a fern. I have heard people say, 'Them's not ferns, they're only Breckans.' The Hart's Tongue fern is invariably called 'Hartstone,' and is the only fern that appears to be specifically recognised. Rushes are 'Seäves.' They are mown in the carrs in August to make rough bedding for cattle.

It is singular that some of the most conspicuous trees of the district (e.g., the Wych Elm) and some of the brightest and most abundant flowers (e.g., the male Orchis) are undistinguished by the people, who are unable to give them any name.

NOTE—ORNITHOLOGY.

Bird-names in South Westmorland.—In connection with Miss Mary L. Armitt's notes on Lakeland Bird-names in the last number of 'The Naturalist,' may be added two or three other names current in South Westmorland: 'Bottle Tit' for Long-tailed Tit, 'Bessie' for Yellow Hammer (our centenarian, Mrs. Ann Gibson, calls it 'Bessie Blakeling'), 'Bessie Black-cap' for Black-headed Bunting, 'Skell-drake' for Shell-drake, 'Doup Craw' for Carrion Crow, 'Ullet' for Owl, 'Mountain Thrush' for Missel Thrush, 'Jammie Lang-legs' for Heron, 'Sea Maw' for Sea Gull, 'Willy Wagtail' for Wagtail.—G. STABLER, Levens, Milnthorpe, Westmorland. 15th February 1899.

NOTES—GEOLOGY.

Shap Fell Granite Boulder in Upper Teesdale. I have found a large boulder in the London Lead Company's Park, Middleton-in-Teesdale, of Shap Fell Granite, size, 3 ft. 6 in. × 5 ft. × 3 ft., originally found in the river Lune, but carried to Middleton-in-Teesdale Park.—WM. HERDMAN, Lanehead Villa, Middleton-in-Teesdale, 7th Jan. 1899.

Preservation of the Royston Shap Granite Boulder. The Barnsley Naturalists' Society has recently brought to a successful termination its long-cherished desire of placing in a position of safety the Royston Shap Boulder, No. 48 in the Eighth Year's Report of the Y.N.U. Boulder Committee. Mr. F. W. T. V. Wentworth, on whose property the erratic lay, consented, at the Society's request, to give it to the Town Council conditionally upon that body providing a site for its display and preservation. The condition being readily acceded to, this important boulder, recently threatened with destruction, is now suitably placed in Locke Park, Barnsley, and, at the time of writing, a descriptive tablet is being prepared. It should also be placed on record that the dimensions given in the report above referred to, prove to be not quite accurate; the act of removing showed the boulder to be partially buried, and the published figures should be altered to 36 × 36 × 34 inches.—WM. E. BRADY, 5, Victoria Road, Barnsley, 22nd March 1899.

THE BURSTING OF THE BUDS IN SPRING.

P. Q. KEEGAN, LL.D.,
Patterdale, Ullswater.

'Solvitur acris hiems grata vice veris et Favoni.'—HORACE.

'CRABBED winter dissolves itself in the joyful alternation of spring and the west wind.' It is hoped that this translation is sufficiently poetical, and will also serve to rivet attention on what might be termed a counterpart phenomenon presented by science, that is to say, the fact that the unfolding of the buds in the merry spring-time is preceded by a physiological or chemical dissolving and alternation of a very interesting description. Confining our attention to what specially concerns us here, viz., the bark of our forest trees, it is known that this in all cases is practically devoid of starch during the dreary winter months, its place being occupied chiefly by a fatty oil and glucose. As soon, however, as the lengthening days and not-so-chilly nights return again soon after the opening of the year, a very serious change is brought about in that part of the tree which upholds, feeds, and ministers to the timely necessities of those incipient organs known as the buds. The barky envelope of every twig and bough that has survived the chilly storm and icy blast wakes up, so to speak, from wintry sleep. The dormant energies of its living tissues are aroused into activity at the imperious summons of the organic needs of what has been called 'the hereditary periodicity of certain properties of the protoplasm,' which is stimulated but not caused by the current condition of the environment. The respiratory process, subdued, if not quite stagnant, during the winter months, is now supplemented by another vigorous physiological process akin to assimilation. The warm raiment of the winter oil vanishes from every twig and bough, and about the 1st of March a quantity of starch steps into its place, beginning in the youngest branchlets and marching gradually but surely into the crown and central shaft of the tree. But all this represents what may be termed a general preparation which is by no means sufficient as a basis for the operations that are to follow. Other requisites and perquisites are indispensable in the spring-time. For instance, sometimes the pith of the up-to-ten-year-old branches contains at the nodes a sort of diaphragm structure consisting of a kind of 'albumen' (like as in seeds) destined for future nutrition; and again, at the base of the buds themselves a special tissue is detected wholly made up of nucleated cells provided with

protein and hydrocarbons, and attended by a host of other cells containing crystals. In fact, one of the most notable features in this connection is the wide distribution, concentrated accumulation and persistence of lime (as oxalate of calcium) in the young shoots, pith, bud-scales, and buds during the whole of the winter season.

But do the buds themselves participate in the important transformations that come to pass in their immediate vicinity? Yes, they do, but perhaps not quite so completely. In October, or at the time of the fall of the leaf, each bud is enriched with starch, albumenoids, tannin, and a little fatty oil; but it is very remarkable that at this period they are bereft of glucose or other respirable material, and hence they cannot then be artificially made to grow. During the winter this starch disappears, a portion of it migrating apparently in a modified form into the embryonal organs at the base of the buds, while the other portion undergoes some unknown decomposition. There is little doubt that the greater quantity of the starch stored up in the autumn buds undergoes transformations similar to what we have already described in the case of the bark, viz., it is reabsorbed, and tiny droplets of fat are deposited in the fixed and stationary protoplasm, and, meanwhile, glucose or other carbohydrate gradually enters in increasing quantity into solution in the cell sap. Now, need we insist that no better provision than this could be effected as a safeguard and resistance against the wintry chill? The easily coagulable protoplasm, or the passive or active proteid matter, is liberally enriched with non-freezable fatty oil, which is encompassed by a readily-combustible carbohydrate, physiologically influential as a source of heat. In addition to this, moreover, the tannin present in October persistently remains over unaffected in quantity during the winter, and occupies chiefly the cells which do not contain much oil. In cases like those of the horse-chestnut and our fruit trees, where, even already in the autumn, not only the end of the young shoot, but a branch-system with flower buds and more or less developed leaves are already so far formed, it is evident that a still further resisting coverlet must be provided. This is done, in fact, by the formation of what are called leaf-scales, which are incrusted with a waxy, resinous, or gummy exudation, and lined inside by a felt of cellulosic down or wool; and our poetical evolutionists are always much pleased to trace the gradual transition in form between the scale and the tolerably fully-formed young leaflet.

Naturalist.

What, then, is a bud? The text-book definition is, that it is 'the young condition of a shoot; either the whole young shoot, or the young portion at the free end of a shoot already further developed'; or it is 'the growing point of a shoot surrounded by its leaves.' Its formation depends on the under side of a foliar organ growing more strongly than the upper side thereof. Then again, buds have been regarded as one of the chief reservoirs of reserve material, viz., essentially only of proteids, carbohydrates, and fats; but this description is correct only under the limitations which we have already alluded to. When the bud unfolds, growth in length commences to become stronger on the upper side of the embryonic leaf, i.e., the blade extends in surface by intercalation of new substances by means of water between its base and its apex, both of which points remain as they were before. Strictly speaking, then, it may be concluded that in most cases the principal structural and functional portions of the mature leaf were non-existent in the bud out of which they were produced. In fact, with certain exceptions, only a small portion of the skeleton of the leaf, i.e., its base and apex, actually existed in the bud (or 'gem,' as Dryden calls it); the whole of the lamina or blade is formed subsequently. In other words, in a rigid scientific point of view, a bud may be defined as a very rudimentary skeletal structure placed in the immediate vicinity of a magazine of cells, some of which are essentially reproductive, i.e., have a clearly defined nucleus and abundant white, translucent protoplasm, while others are essentially vegetative, i.e., have large vacuoles full of meat or mineral matter, around which the protoplasm may be readily transformed into a vehicle of nutritive substances. At the commencement of their germination there is but little respiration, according to some observers, but its quantity increases with the progressive development of the young leaf. The intensity of the transpiration in the young bud is very great, but this also seems to diminish after a certain time. In fact, the phenomena attending the development of the leaf-bud is very similar to those which are observable on the development of the flower-bud.

We need not dwell upon the beauties of the opening woods. 'The tops of the horse-chestnut boughs look as if they glowed into the air with life,' says Hunt. And 'each young spray a rosy flush receives,' exclaims another poet. Nor need we travel as far as the tropical West Indies, where, as has been said, 'at the beginning of the rainy season in April and May

numerous trees assume entirely a red appearance by the red colouration of the freshly developing twigs: the colour is so intense that the landscape acquires thereby a positive colouration.' It will only be necessary to offer a few remarks relative to the similar or analogous phenomena presented by our forest trees. A cross section through the winter buds revealed the presence of tannin in all cases under the form of a hyaline, strongly opalescent, and refractive mass occupying a great portion of the mesophyll and the vascular sheaths as well as the epidermis in beech, oak, hazel, rose, etc.; in the epidermis and sub-epidermis of elm, chestnut, walnut, elder, hawthorn, wild cherry, sycamore, and horse-chestnut; while in poplars and willows it is chiefly sub-epidermal. Some of the leaflets just bursting from the buds and the young shoots as well assume a decidedly brilliant and beautiful rosy flush of colour, while others, such as those of the horse-chestnut and lilac, are only feebly, or not at all reddened under precisely similar circumstances. It is in the unfolding leaflets of the oak, chestnut, walnut, and of certain species of poplar, willow, and maple, that the very pretty pinkish or crimson colouration is most eminently exhibited. The young shoots, leaf-scales, or leaf-stalks of beech, lime, sycamore, aspen, field maple, etc., are much given to blushing very deeply and conspicuously just when, instinct with the fresh vitality of the bursting season, they newly enter into life. The case of our common beech is especially remarkable. No sooner has its young shoot broken through the bud than it is immediately coloured red, the leaf-scales which do not fall off are also capped with red on their upper surface, while a little later the stalks of the tiny leaflets join in the general blushing, especially on the side facing the light; and all this while the baby leaflets themselves burst forth as clearest emeralds.

Now, what do those leaflets contain which are specially distinguished for a pinky red, as contrasted with those which are brightly, brilliantly, perfectly pure green? Thus, as has been remarked about the oak, 'a constant succession of pink and brown-tinted glories of the young leafage is kept up in our moist summers till late in the autumn.' These specially roseate organisms contain apparently all along and from the first moment of their existence a certain quantity of tannic chromogen ready formed; all other leaflets contain merely the tannoid quercetin, or one of its allies, whose presence may possibly influence to some extent the tint of its infantile drapery. The deep brown of the opening cherry, etc., leaf is due apparently to a decomposition product of albumen called **tyrosine.**

THE AVIFAUNA OF STAITHES AND LOFTUS-IN-CLEVELAND, YORKSHIRE.

KENNETH McLEAN,

Harrogate; Joint Secretary of the Vertebrate Section of the Yorkshire Naturalists' Union.

PERHAPS no more interesting district for the ornithologist can be found than the bit of Cleveland coast extending from Staithes to Skinningrove, and inland for about five miles.

This piece of ground is cleft at the coast by two deep valleys, one at Staithes, the other at Skinningrove. These valleys as they go inland are divided and subdivided into many thickly-wooded gorges stretching for miles, the sides of which are in many places very precipitous, and along the bottom of which clear, sparkling streams leap over mossy rocks or ripple over sandy bottoms; following these streams to their sources we find them springing away up on the heather-clad moors of Easington, Waupley, and Liverton.

Thus we have in so short a distance the beach with its stretches of weed-clad rocks exposed at low tide, amongst which we may find hundreds of miniature lakes fringed with the most beautiful marine vegetation, rich feeding places for the Gulls, Herons, Ducks, etc., and here and there little sandy coves where the Sandpiper and other waders find their winter's home and food. The coast cliffs, commanding and rugged, broken into by the huge quarries which have been worked out in connection with alum making, where the autumn migrants, exhausted with their long flight and battles with the wind and storms they have encountered as they crossed the wild North Sea, land in large quantities, where the Jackdaws, Gulls, Starlings, Rock Pigeons, Cormorants, Kestrels, Martins, Swifts, and many others have their breeding corners.

And leading up from the coast the valleys, with sides wooded with oak, ash, beech, birch, larch, etc., draped with luxuriant undergrowth of hazel and briar, interwoven with festoons of ivy and honeysuckle; and underneath all a rich carpet of ferns, mosses, and a thousand other beautiful vegetable growths, and swarming with feathered inhabitants. Between these valleys stretch rich tracts of agricultural land abounding with birds belonging to the Fringilline, Sylvine, and Saxicoline families; and beyond these we find the moorland rising to

about a thousand feet above sea level, with its Grouse, Wild Duck, Snipe, Curlew, and many other moorland birds. Surely, for the ornithologist a richer or more varied field could scarcely be found in so small a compass.

There are, however, some drawbacks from an ornithologist's point of view. There is a want of marshy ground and of mud banks. There are certainly some pieces of ground with growths of rushes and such like coarse vegetation, providing nesting places for a few of the birds which love that kind of home, and so we have a sprinkling of such birds as the Sedge Warbler, Reed Warbler, Reed Bunting, etc., breeding, but only in very limited numbers. The mud banks, however, are altogether wanting, and we find many of the waders here only when they are driven by severe weather from their usual haunts or making this coast a resting-place, a sort of wayside inn, as they pass backwards and forwards during their migrations.

Another cause of discomfort to the birds, especially the migrants, has sprung up during the last thirty years in some parts of the district.

Skinningrove was once a pretty little quiet village nestling between the hills. It has now become a town. The banks to the west were once covered with a thick pine wood, and bramble and gorse bushes stretched nearly down to the sea edge; these have been swept away, and the hillside is now a network of railroads; and at the top stand a number of black furnaces continually belching forth smoke and flame. Up the valley, too, a transformation scene has taken place; the valley, once beautiful, is now filled with mines, engine shops, pit props, and smoke. Sights and sounds are seen and heard day and night, pleasant no doubt from a financial point of view, but not by any means pleasant to the delicate senses of the migrants wishing to land there.

Again, a little higher up the valley the calcining kilns connected with the Liverton Mines are pouring out sulphurous fumes which have played havoc with the vegetation in the adjoining woods.

The whole of the timber in what is called the West Wood was so much injured by the smoke that it had to be cut down. This wild, precipitous gorge has, however, again become filled with young trees matted together with tangled undergrowth, and the stream at the bottom, which had become sadly polluted with sewerage, is again comparatively clear, and the home of many a lusty trout.

Inland, however, the woods retain their pristine beauty. There are many quiet corners where the homes of beast, bird, or fish are rarely intruded upon by human beings.

On the south-east of our district the valleys of Grinkle and Roxby running up from Staithes have been very little interfered with. They are full of beautiful scenery, and teem with bird life.

In many places the north and north-east winds of early spring are completely shut out by the many twists and turns of the valleys, and on these wooded slopes facing the south we may find the primrose and other spring flowers blooming, and the Blackbird, Thrush, etc., nesting very early.

Like the wooded valleys on the west of our district we may find here many beautiful retired nooks, where the flowers bloom unseen, and the birds sing their sweetest songs, heard only by their patient sitting mates, or busy feathered neighbours.

TURDIDÆ.

***Turdus viscivorus*. Missel-Thrush.** Pretty common; breeding in most parts of the district, and the numbers increased by autumn visitors.

***Turdus musicus*. Song Thrush.** Common.

***Turdus iliacus*. Redwing.** A regular winter visitor, coming in large quantities, sometimes as early as September.

***Turdus pilaris*. Fieldfare.** Like the Redwing, coming regularly in the autumn months.

***Turdus varius*. White's Thrush.** Not seen nearer than Danby (Eskdale) by Rev. J. C. Atkinson.

***Turdus merula*. Blackbird.** Resident and abundant. Hundreds of migrants to be seen in the autumn amongst the turnips, potatoes, etc., near the coast.

***Turdus torquatus*. Ring-Ouzel.** Numbers breed on the high moors. I have seen them on the banks facing the sea in December, probably some migrants passing southwards.

***Saxicola œnanthe*. Wheatear.** One of the earliest to make its appearance as a spring visitor; breeds freely, especially near the moors.

***Pratincola rubetra*. Whinchat.** Spring visitor, coming in April and nesting in most parts of the district.

***Pratincola rubicola*. Stonechat.** More common than I have known it in any other district.

***Ruticilla phœnicurus*. Redstart.** Fairly common; generally distributed as a summer breeder.

Ruticilla titys. **Black Redstart.** Occasional visitor; I have seen it twice, once in mid-winter and once in spring.

Erithacus rubecula. **Redbreast.** Common; many near the coast amongst the bean fields, etc., in the autumn.

Daulias luscinia. **Nightingale.** No evidence to be depended upon of its having been heard or seen.

SYLVIINÆ.

Sylvia sylvia. **Whitethroat.** A regular visitor, breeding plentifully throughout the district.

Sylvia curruca. **Lesser Whitethroat.** Not nearly so common as the preceding, but generally distributed.

Sylvia atricapilla. **Blackcap.** Not by any means common, but a few breed every season. Frequently met with in the autumn, most likely those which have bred further to the north.

Sylvia hortensis. **Garden Warbler.** Not common. More frequently seen in spring and autumn than in summer.

Regulus regulus. **Goldcrest.** Pretty common as a breeder, and abundant in the autumn.

Phylloscopus rufus. **Chiffchaff.** As plentiful as any of the summer visitors.

Phylloscopus trochilus. **Willow Warbler.** Very numerous.

Phylloscopus sibilatrix. **Wood Warbler.** Breeds regularly in the district, but is not very numerous.

Acrocephalus streperus. **Reed Warbler.** Breeds very sparingly in the district, but is frequently seen in spring and autumn.

Acrocephalus phragmitis. **Sedge Warbler.** Fairly abundant, chiefly in autumn and spring. Does not breed very freely in the neighbourhood.

Locustella nævia. **Grasshopper Warbler.** Of rare occurrence as a breeder.

ACCENTORINÆ.

Accentor modularis. **Hedge-Sparrow.** Abundant; numbers increased in autumn.

SITTIDÆ.

Sitta cæsia. **Nuthatch.** Very rarely seen; not known to have bred in the district.

TROGLODYTIDÆ.

Troglodytes parvulus. **Wren.** Very common, numbers arriving in the autumn.

PARIDÆ.

Acredula rosea. **British Long-tailed Titmouse.** Generally distributed over the district, and common.

Parus major. **Great Titmouse.** Resident, common.

Parus britannicus. **British Coal Titmouse.** Plentiful, sometimes very numerous in the winter.

Parus palustris. **Marsh Titmouse.** Not so common as others of the family, but frequently seen.

Parus cæruleus. **Blue Titmouse.** Common.

A retired nook by the side of the stream in the Loftus Woods, where the Dipper breeds year after year: nest shown at the right of sketch.

CINCLIDÆ.

Cinclus aquaticus. **Dipper.** Breeds regularly on all the small streams that come down the valleys. In severe weather I have seen it on the beach amongst the rocks.

MOTACILLIDÆ.

Motacilla lugubris. **Pied Wagtail.** Resident; abundant; breeding by the side of all the streams, also among the rocks near the beach.

Motacilla melanope. **Grey Wagtail.** Fairly abundant, coming in the early spring, and breeding throughout the district.

Motacilla raii. **Yellow Wagtail.** Pretty common; breeding freely; comes in March and April and leaves in September or October.

Anthus pratensis. **Meadow Pipit.** Freely distributed; resident; large numbers seen in the autumn, many no doubt passing to the south.

Anthus trivialis. **Tree Pipit.** Summer visitor; breeding, and disappearing in September.

Anthus obscurus. **Rock Pipit.** Frequently seen, both winter and summer; no doubt breeds in the district, but I have not seen its nest.

ORIOLIDÆ.

Oriolus galbula. **Golden Oriole.** One shot by Sanderson, keeper for Lord Downe, in woods near to Kilton Castle.

LANIIDÆ.

Lanius excubitor. **Great Grey Shrike.** Occurs frequently from September to December; also in March and April.

Lanius collurio. **Red-backed Shrike.** A very rare visitor.

AMPELIDÆ.

Ampelis garrulus. **Waxwing.** Many specimens both caught and shot in neighbourhood; have seen them feeding on haws.

MUSCICAPIDÆ.

Muscicapa grisola. **Spotted Flycatcher.** A regular summer visitor, arriving late and away again in September.

Muscicapa atricapilla. **Pied Flycatcher.** Has nested occasionally in the district. Is often seen in spring and autumn.

HIRUNDINIDÆ.

Hirundo rustica. **Swallow.** Arrives in April and leaves September and October.

Chelidon urbica. **Martin.** Abundant, breeding under the cliff-ledges facing the sea.

Cotile riparia. **Sand Martin.** Breeds freely in most of the sand quarries round.

CERTHIIDÆ.

Certhia familiaris. **Creeper.** Very common; more plentiful than I have seen them elsewhere.

FRINGILLINÆ.

Carduelis carduelis. **Goldfinch.** Frequently seen, especially in the autumn, but rarely ever breeds in the district.

Chrysomitris spinus. **Siskin.** Fairly common in the autumn and winter, and one or two nests have been seen.

Ligurinus chloris. **Greenfinch.** Very common, breeding freely, and numbers coming as migrants.

Coccothraustes coccothraustes. **Hawfinch.** Occasionally seen; breeds, if not in the district, very near.

Passer domesticus. **House Sparrow.** Very common.

Passer montanus. **Tree Sparrow.** Breeds regularly, but not in large numbers; many come as visitors.

Fringilla cœlebs. **Chaffinch.** Very plentiful.

Fringilla montifringilla. **Brambling.** Comes in large quantities as a winter visitant. I have known them in severe winters almost as common as sparrows.

Linota cannabina. **Linnet.** Breeds freely on banks facing sea, and on the high ground near the moors.

Linota linaria. **Mealy Redpoll.** Only known as a winter visitor, making their appearance every year, more or less.

Linota rufescens. **Lesser Redpoll.** Breeds regularly near the moors. The numbers are largely increased by migrants, which I have seen landing as early as the end of August and September.

Linota flavirostris. **Twite.** Breeds sparingly on the moors, Waupley and Grinkle. Numbers come along with the Linnets, Redpolls, etc., in the autumn, and may be found in flocks on the stubble and near the farm-houses; generally called 'Grey Linnet' by the people of the district to distinguish it from the Brown Linnet.

LOXIINÆ.

Pyrrhula pyrrhula. **Bullfinch.** Fairly numerous, breeding regularly in the district; more plentiful in the autumn.

Loxia curvirostra. **Crossbill.** A winter visitor of frequent occurrence. Large numbers often seen in the Grinkle Woods and other parts of the district. Has not been known to breed in the neighbourhood.

EMBERIZINÆ.

Emberiza miliaria. **Corn Bunting.** Very common; numbers come in the autumn and winter.

Emberiza citrinella. **Yellowhammer.** Resident, abundant.

Emberiza schœniclus. **Reed Bunting.** Very few breed in the district, but a good many come from the north in the autumn and leave in the spring.

Plectrophanes nivalis. **Snow Bunting.** A winter visitant, large numbers coming in October and later if the winter is severe; generally in parties of half-a-dozen or so, but occasionally in large flocks.

STURNIDÆ.

Sturnus vulgaris. **Starling.** The crevices in the face of the towering cliffs afford famous nesting places for these birds, which breed there by hundreds.

Pastor roseus. **Rose-coloured Pastor.** Rare visitor; several shot at Skinningrove in the winter of 1862.

CORVIDÆ.

Pyrrhocorax graculus. **Chough.** Some of the old men, many years ago, have told me of Red-legged Daws which used to be seen, and most likely bred in the cliffs; there is no doubt the bird referred to was the Chough.

Garrulus glandarius. **Jay.** At one time common, but getting scarce. A good many come as autumn migrants.

Pica pica. **Magpie.** Still pretty common, notwithstanding the number of its enemies.

Corvus monedula. **Jackdaw.** Very numerous; hundreds breeding in the cliffs overhanging the sea.

Corvus corone. **Carrion Crow.** Getting scarce, but still a few pairs breed in the neighbourhood every year.

Corvus cornix. **Hooded Crow.** Comes in large quantities in the autumn. Have seen scores of them landing in the course of an hour.

Corvus frugilegus. **Rook.** Plentiful, but there is only one rookery (Loftus Hall) in the district.

Corvus corax. **Raven.** Occasionally seen in the cliffs, where it once bred, but not within the last 60 years. Two once seen (one mostly white) perched on a human corpse washed up on the beach.

ALAUDIDÆ.

Alauda arvensis. **Sky Lark.** Abundant; large numbers come in the autumn from the northern parts of the Continent.

Alauda arborea. **Wood Lark.** Not plentiful, but some breed in the district every year.

Otocorys alpestris. **Shore Lark.** A regular winter visitor; have seen scores after severe weather.

CYPSELIDÆ.

Cypselus apus. **Swift.** A good many breed in the cliffs; plentiful.

CAPRIMULGIDÆ.

Caprimulgus europæus. **Nightjar.** Fairly common, many places in the district being visited year after year.

PICIDÆ.

Dendrocopus major. **Great Spotted Woodpecker.** Seen occasionally as an autumn migrant, but has not been known to breed.

Dendrocopus minor. **Lesser Spotted Woodpecker.** Very doubtful. I knew of a stuffed specimen in Loftus which was supposed to have been killed in the district, but afterwards heard that it had come from near Castle Howard.

Gecinus viridis. **Green Woodpecker.** Resident, but not by any means numerous.

IYNGINÆ.

Iynx torquilla. **Wryneck.** Rarely seen, only spring and autumn visitors having been noticed.

ALCEDINIDÆ.

Alcedo ispida. **Kingfisher.** Quite a rare bird. It is very doubtful whether any breed in the district. I have seen it on the beach in very severe weather.

UPUPIDÆ.

Upupa epops. **Hoopoe.** A good many have been got in the district; one shot by Mr. Atkinson, Golden Lion Inn, Loftus, 1872, and one by Mr. C. Spink, gardener, Loftus Hall, the following year.

CORACIIDÆ.

Coracias garrula. **Roller.** I cannot hear of its having been seen, but it has been obtained just outside the district, viz., near Skelton.

CUCULIDÆ.

Cuculus canorus. **Cuckoo.** Very plentiful; breeding freely, especially near the moors.

STRIGIDÆ.

Strix flammea. **Barn Owl.** Not common. Have seen a pair nesting in the cliffs on the coast.

Asio otus. **Long-eared Owl.** Breeding occasionally in the woods, Grinkle and Liverton; a good many arriving in the autumn from the Continent.

Asio brachyotus. **Short-eared Owl.** Breeds rarely; large numbers coming from the north in the autumn; after a north-east storm I have counted twenty in a walk of a mile's length along the cliffs.

Syrnium aluco. **Tawny Owl.** Common. Seen and heard in the woods throughout the district.

Bubo bubo. **Eagle Owl.** One shot by myself on 5th Nov. 1875 on the banks near Hummersea, now in my possession, is represented in the accompanying illustration.

Eagle Owl, taken from stuffed specimen in my possession; shot on the sea banks between Skinningrove and Hummersea, 5th November 1875.

Nyctala tengmalmi. **Tengmalm's Owl.** An owl shot by Thos. Metcalf, keeper, Highfields, January 1872, in the Handale Woods, seems to have been this species.

FALCONIDÆ.

Circus æruginosus. **Marsh Harrier.** One shot on Waupley Moors, 1859. Has been several times seen.

Circus cyaneus. **Hen Harrier.** Occasionally seen. Known to the gamekeepers as 'Ringtails.' Have seen specimens nailed to walls.

Circus cineraceus. **Montagu's Harrier.** Uncertain, but several birds answering the description have been seen.

Buteo buteo. **Buzzard.** At one time frequently seen; has been known to breed on the high ridge of moor between Waupley and Danby.

Archibuteo lagopus. **Rough-legged Buzzard.** Frequently got in the autumn. Saw one last November in the window of Mr. Eddis, barber, Loftus, which had been shot at the moor end of Grinkle Woods.

Aquila chrysaëtus. **Golden Eagle.** One seen several times in the woods near Handale Abbey—'about 1856.'

Haliaëtus albicilla. **White-tailed Eagle.** Several seen. One shot by G. Allinson, Skinningrove, on banks between Skinningrove and Cattersty, autumn of 1860.

Milvus milvus. **Kite.** Several seen and obtained in the district. One shot by William Latty, gamekeeper for Lord Zetland, 1868, in the woods, Highfields.

Accipiter nisus. **Sparrow-Hawk.** Fairly common; numbers increased in the autumn.

Falco peregrinus. **Peregrine Falcon.** Was once of frequent occurrence. I have seen several specimens shot. One now in my possession was obtained on the Highfields Farm.

Falco subbuteo. **Hobby.** Has been frequently seen and shot. Several hung on trees and gamekeepers' houses, Highfields, Liverton, etc.

Hierofalco islandus. **Iceland or Jer Falcon.** I followed a bird for some hours in the winter, 1870, but could not get within range; from the colour and flight of the bird I am pretty certain it was a Jer Falcon.

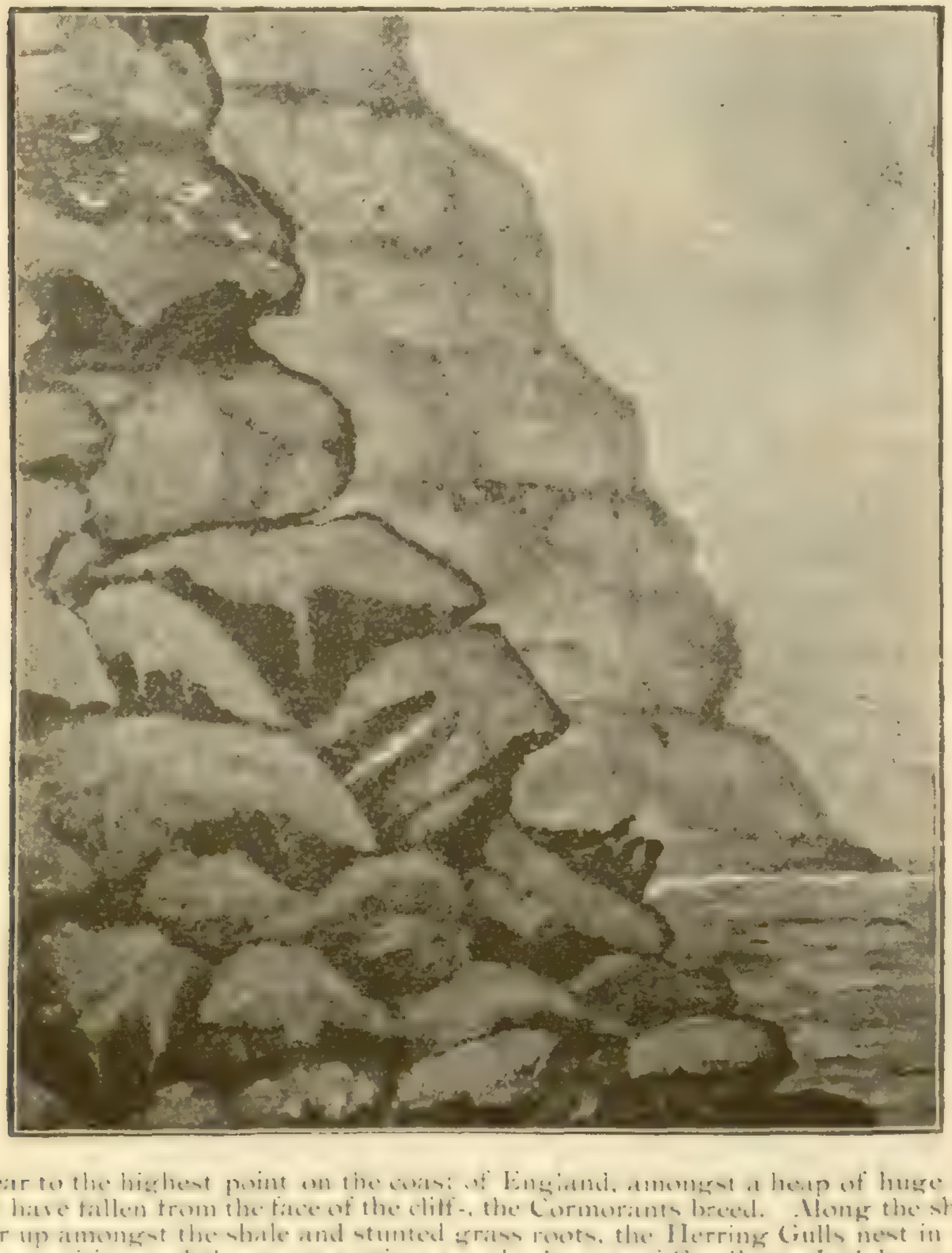
Tinnunculus vespertinus. **Red-legged Falcon.** Have heard Sanderson, keeper for Lord Downe, describe a Hawk he shot

in 1873, near the moor, as having red legs and very dark on back. Unfortunately the specimen was not preserved.

Falco æsalon. **Merlin.** At one time nested regularly in the district on the higher part of the Waupley Moors; is now only occasionally seen.

Tinnunculus tinnunculus. **Kestrel.** Very common, breeding both in the cliffs on the coast and in the woods.

Pandion haliaëtus. **Osprey.** Several obtained in the neighbourhood some years ago, but I can only learn of one within the last thirty years, which was shot by Mr. R. Stonehouse, of Skinningrove, October 1870.



Near to the highest point on the coast of England, amongst a heap of huge rocks which have fallen from the face of the cliffs, the Cormorants breed. Along the shelves higher up amongst the shale and stunted grass roots, the Herring Gulls nest in enormous quantities, and the many crevices are the homes of Starlings, Jackdaws, Rock Pigeons, Swifts, and Kestrels. The House Martins also find suitable places for their mud nests under the overhanging ledges.

PELECANIDÆ.

Phalacrocorax carbo. **Cormorant.** To be seen in some numbers breeding regularly in the cliffs near to Rockcliff.

Phalacrocorax graculus. **Shag.** Visiting the coast every spring and autumn; sometimes a good many are seen.

Sula bassana. **Gannet.** More or less seen every year, especially at the end of August, in September and October.

ARDEIDÆ.

Ardea cinerea. **Heron.** Pretty common; on the moors, in the streams, and generally to be found on the beach at low tide. It has not been known to breed in the district.

Nycticorax griseus. **Night Heron.** One seen several times on some ponds and marshy ground, Waupley Moors, in the autumn of 1860 or 1861; was shot at by Thomas Metcalf but not obtained.

Ardetta minuta. **Little Bittern.** Has been seen several times, once by myself in January 1870 on the banks facing the sea near Loftus Alum Works.

Botaurus stellaris. **Bittern.** One seen on the shore in October 1865; also in Cattersty, November 1865, most likely the same bird; it was shot by a man named Bousfield and placed in the hand of a miner, who made some attempt to preserve it. The effort was so clumsy it could scarcely be recognised, and the preserving material used had been so poor the specimen soon went to decay. The men called it a 'Speckled Heronsue.'

CICONIIDÆ.

Ciconia alba. **White Stork.** A bird seen several times in February 1858 on some boggy ground near the source of Grinkle Beck, must have been the White Stork. The man I heard speak of it, Mr. Lawson, Waupley Inn, would know the Common Heron quite well, as there are many in the neighbourhood; he described it as being larger and whiter except for the black wings.

ANATIDÆ.

Anser anser. **Grey Lag Goose.** Has occasionally been got; is seen passing over in the autumn and spring.

Anser segetum. **Bean Goose.** Some have been shot on the beach; seen passing over.

Anser brachyrhynchus. **Pink-footed Goose.** Frequently seen in the winter time; flocks occasionally on the moors, sometimes visiting the autumn stubbles.

Anser albifrons. **White-fronted Goose.** Has been seen on the beach in very severe weather.

Bernicla bernicla. **Brent Goose.** Frequently seen in the autumn near the coast.

Bernicla leucopsis. **Barnacle Goose.** One shot by Mr. R. Stonehouse, Skinningrove, in 1859, out of a flock of about a dozen.

Cygnus cygnus. **Whooper Swan.** Seen in severe winters amongst the rocks at low tide.

Cygnus bewicki. **Bewick's Swan.** Several seen in the Skinningrove Beck, 1864. Sometimes seen passing overhead going south in the autumn and north in spring.

Tadorna tadorna. **Common Sheldrake.** Occasionally seen; was at one time said to breed on the banks near Cattersty.

Dafila acuta. **Pintail.** Seen occasionally as a visitor.

Mareca penelope. **Wigeon.** A good many seen on the coast in severe weather.

Anas boschas. **Wild Duck.** Fairly numerous in the winter on the beach at low tide and in the streams; it also breeds on the Waupley Moors, and in autumn and spring visits the ponds on the moors in large quantities.

Querquedula crecca. **Common Teal.** Breeds on the moors, sparingly. A good many come in the autumn and winter.

Spatula clypeata. **Shoveller.** Not often seen; several have been got. One in my possession, a drake, got in 1873; more were seen at the time.

Fuligula fuligula. **Tufted Duck.** A winter visitor of not very frequent occurrence.

Fuligula marila. **Scaup.** Frequently off the coast.

Fuligula ferina. **Pochard.** Pretty common as a winter visitor; is not known to breed in the district.

Clangula glaucion. **Goldeneye.** With the exception of the Mallard is the most common of the Ducks, especially on the coast in severe weather.

Harelda glacialis. **Long-tailed Duck.** Young birds frequently seen off the coast, and occasionally old birds have been seen on the beach during violent storms.

Somateria mollissima. **Eider Duck.** I have not seen it on the beach, but several times about a mile out from Hummersea.

Œdemia fusca. **Velvet Scoter.** Seen occasionally out at sea, sometimes near the coast.

Œdemia nigra. **Common Scoter.** Seen every year off the coast, occasionally also on the moors.

Mergus merganser. **Goosander.** I have seen them from the beach, close in to the rocks.

Mergus albellus. **Smew.** Occasionally met with near the coast. I remember once after a storm in March seeing several in the beck near Skinningrove.

COLUMBIDÆ.

Columba palumbus. **Ring Dove.** Abundant; numbers largely increased in the autumn and winter, immense flocks coming in severe weather.

Columba œnas. **Stock Dove.** Fairly numerous, breeding in most parts of the district.

Columba livia. **Rock Dove.** Common; large numbers breed in the cliffs. The pigeons from the cotes round about pair and breed with them amongst the rocks. I have frequently seen their nests with several colours of birds in them.

Turtur turtur. **Turtle Dove.** I cannot hear of its having been seen except in the autumn and occasionally in spring.

PHASIANIDÆ.

Phasianus colchicus. **Pheasant.** Abundant.

Caccabis rufa. **Red-legged Partridge.** Has occasionally been shot early in September, and has most probably bred in the district.

Perdix perdix. **Partridge.** Numerous.

Coturnix coturnix. **Quail.** Has been known to breed, but not for some years.

TETRAONIDÆ.

Lagopus scoticus. **Red Grouse.** Plentiful; I have seen packs leave the moors in very severe weather, and go on to the beach.

Tetrao tetrix. **Black Grouse.** Very rarely seen. One during the autumn and winter of 1894 took up its abode in a rabbit warren facing the sea, but disappeared in the spring. It was a male bird.

RALLIDÆ.

Rallus aquaticus. **Water-Rail.** Occasionally seen in the summer, and no doubt breeds in the district. The numbers are increased in the autumn.

May 1899.

Porzana porzana. **Spotted Crake.** Occasionally seen, chiefly in the autumn; I cannot hear of its having nested in the district.

Crex crex. **Corn Crake.** I have known them sometimes come in March and shelter in the plantations until the grass, etc., outside is sufficiently grown to cover them.

Gallinula chloropus. **Moor-hen.** Common.

Fulica atra. **Coot.** Only occasionally seen, not by any means common.

ŒDICNEMIDÆ.

Œdicnemus œdicnemus. **Stone-Curlew.** Rarely seen, once or twice in the spring, but has not been known to breed.

CHARADRIIDÆ.

Charadrius pluvialis. **Golden Plover.** Plentiful, breeding on the moors, and large flocks coming in the autumn.

Squatarola helvetica. **Grey Plover.** Nothing like so numerous as the Golden Plover, but fairly plentiful in the winter.

Ægialitis hiaticula. **Ringed Plover.** I have seen it on the banks facing the sea in May; most likely it nested there, but I never found a nest. A good many come in the winter.

Eudromias morinellus. **Dotterel.** Seen occasionally in the spring and autumn.

Vanellus vanellus. **Lapwing.** Common; immense flocks in the autumn, generally going south if the weather is very severe.

Strepsilas interpres. **Turnstone.** Seen every year, generally in the autumn.

Hæmatopus ostralegus. **Oyster-catcher.** Only a few have been seen on the coast.

SCOLOPACIDÆ.

Phalaropus fulicarius. **Grey Phalarope.** Has been seen on several occasions.

Scolopax rusticola. **Woodcock.** Has been known to breed at least once at the top end of the Handale Woods, near Handale Abbey. The coast here is a favourite place for it landing in the autumn, the high cliffs attracting it. I have seen them come early in September.

Gallinago gallinago. **Common Snipe.** Breeds on the moors; large quantities come in the autumn.

Limnocryptes gallinula. **Jack Snipe.** A regular visitor; pretty common all through the winter.

Tringa alpina. **Dunlin.** Only known as a winter visitor.

Tringa minuta. **Little Stint.** Not an uncommon visitor in the autumn.

Tringa subarquata. **Curlew Sandpiper.**

Tringa striata. **Purple Sandpiper.**

These two species are frequently seen in the pools left amongst the rocks at low tide.

Tringa canutus. **Knot.** Seen most winters, but not in large quantities.

Calidris arenaria. **Sanderling.** To be seen almost any time in the winter on the sands at Skinningrove and Hummersea; also in several sandy coves under the cliffs betwixt Hummersea and Staithes.

Tringoïdes hypoleucos. **Common Sandpiper.** Only seen in the spring and autumn; does not breed in the neighbourhood.

Helodromas ochropus. **Green Sandpiper.** Occasionally seen in the autumn.

Totanus calidris. **Redshank.** Fairly common in the autumn; sometimes seen in considerable numbers.

Totanus canescens. **Greenshank.** To be seen frequently on the beach in the autumn.

Limosa lapponica. **Bar-tailed Godwit.** Not at all common, but occasionally seen as a passing visitor.

Limosa ægocephala. **Black-tailed Godwit.** I saw one amongst the shingle round Snilah ponds (two large reservoirs close to Hummersea) in November 1870.

Numenius phæopus. **Whimbrel.** Occasionally seen in the fields near the coast; generally called 'Little Curlew.'

Numenius arquata. **Common Curlew.** Pretty common on the beach and in the fields. It does not breed in the district, but just outside.

LARIDÆ.

Sterna macrura. **Arctic Tern.** Frequents the coast in numbers in spring and autumn.

Sterna fluviatilis. **Common Tern.** Plentiful in autumn and spring, going up the streams at Staithes and Skinningrove in severe weather.

Sterna minuta. **Little Tern.** A good many callers as they pass by ; does not breed in the district.

Sterna cantiaca. **Sandwich Tern.** Occasionally seen some distance off the coast.

Hydrochelidon nigra. **Black Tern.** An occasional visitor. Two were seen during a storm up the stream as far as Waup Mill, near Staithes ; one was shot by a man called Shedrack.

Pagophila eburnea. **Ivory Gull.** One seen at Skinningrove, or near to Huntcliffe, November 1871.

Larus glaucus. **Glaucous Gull.** I saw several at Staithes in November 1878, some of which were shot.

Rissa tridactyla. **Kittiwake.** Has occasionally bred in the cliffs near the haunts of the Herring Gulls. Very common in the autumn and spring.

Larus argentatus. **Herring Gull.** Large numbers breed in the cliffs, especially Rockcliffe and Huntcliffe.

Larus fuscus. **Lesser Black-backed Gull.** Quantities come in the autumn.

Larus marinus. **Greater Black-backed Gull.** Very common ; seen with the Herring Gulls on the land following the ploughman.

Larus canus. **Common Gull.** Numbers may be seen all through the winter.

Larus ridibundus. **Black-headed Gull.** Common, especially in spring and autumn.

Larus minutus. **Little Gull.** I have seen odd ones several times both at Hummersea and Skinningrove.

Stercorarius catarractes. **Common Skua.** Occasionally seen near the coast.

Stercorarius pomarinus. **Pomarine Skua.** Not by any means common, but occasionally seen a mile or so off the coast. I saw a man, Jno. Allinson, of Skinningrove, bring two immature specimens on to the beach which he had shot whilst out in a boat.

Stercorarius crepidatus. **Richardson's Skua.** Saw one old bird about four miles inland, either 1879 or 1880 ; occasionally seen at sea.

Stercorarius parasiticus. **Buffon's Skua.** A few have been seen on the sea near the coast.

PROCELLARIIDÆ.

Procellaria pelagica. **Storm Petrel.** Frequently seen off the coast. I have picked one up dead after a severe storm, and have known others got.

Puffinus anglorum. **Manx Shearwater.** Pretty common, especially in the autumn.

Puffinus griseus. **Sooty Shearwater.** Some reported, but doubtful.

Fulmarus glacialis. **Fulmar.** I have seen them out at sea within a half-a-mile of the coast.

COLYMBIDÆ.

Colymbus glacialis. **Great Northern Diver.** Frequently seen a short distance off the coast.

Colymbus ar[c]ticus. **Black-throated Diver.** Occasionally seen. Saw one landed at Staithes which had been caught in a fishing net.

Colymbus septentrionalis. **Red-throated Diver.** The most common of the Divers; often seen and frequently shot off the coast.

PODICIPIDÆ.

Podiceps cristatus. **Great Crested Grebe.** An occasional visitor in winter on the coast, also on ponds inland.

Podiceps grisegena. **Red-necked Grebe.** One or two specimens have been obtained; one was got on ponds at Waupley.

Podiceps auritus. **Sclavonian Grebe.** Is seen occasionally in the autumn on the coast.

Tachybaptes fluviatilis. **Little Grebe.** Frequently seen; have seen several on Snilah ponds near the beach.

ALCIDÆ.

Alca torda. **Razorbill.** Pretty common in the spring, but does not breed in the district.

Lomvia troile. **Common Guillemot.** Frequently seen off the coast, especially in the autumn.

Uria grylle. **Black Guillemot.** Occasionally seen off the coast.

Mergulus alle. **Little Auk.** Often seen off the coast; I have seen as many as a dozen washed up dead on the beach after continued stormy weather.

Fratercula arctica. **Puffin.** Seen occasionally off the coast. Like the *Mergulus alle*, it has been at least twice picked up dead on the beach.

NOTES AND NEWS.

Through the recent death of Mr. T. J. H. Brogden, Solicitor, of Spalding, the Lincolnshire Naturalists' Union have lost a good and valued member. Mr. Brogden was not only a quick and reliable observer, but he was a keen sportsman, and there was no one in South Lincolnshire who possessed such a thorough knowledge of the topography of the Fenlands and their natural history. His favourite shooting and fishing grounds were in the fitties and marshes bordering the Lincolnshire Wash, and here, in the course of years, he became thoroughly acquainted with the birds and fish of a district which includes in its features much that is wildest and most remote in the county. Fortunately, Mr. Brogden has left copious notes in connection with the avifauna and marine and fresh-water fish, and these notes have now kindly been placed at my disposal by his family. It is, therefore, my intention to arrange them in order, and forward, as occasion will permit, to the Editors of 'The Naturalist' for publication, and, in doing this, I feel sure they will prove a valuable addition to the natural history of Lincolnshire, for of the southern parts of the county our knowledge is yet scant.—JOHN CORDEAUX, Great Cotes House, R.S.O., Lincoln, 11th April 1899.

NOTE—MAMMALIA.

Otters in Lincolnshire. -I am sorry to say that two of these animals, which are now becoming rare among our feræ naturæ in this neighbourhood, have been recently killed. I mean the Otter (*Lutra lutra*). One was killed at Thimbleby Mill, on the river Bain, about 1½ miles from Horncastle, on 11th April 1898, Easter Bank Holiday, and another was shot in July by Mr. J. Wright, Mrs. Otter's keeper, of Ranby, a few miles higher up the same river, in the parish of Gouleeby. This latter one was a female, and the mate is still alive and has been seen about the same place. I think we should—if the Lincolnshire Naturalists' Union has any influence—raise our voice against the general destruction of these animals. I believe they do *not*, really, do the amount of harm with which they are credited. They seldom kill the trout, but live chiefly upon the coarser kinds of fish—the chub, roach, and eels. I have seen the skin of the Otter killed at Thimbleby Mill, lent to me by the owner, Mr. Joseph Willson, of Horncastle. It was caught in the wheel of the water-mill and killed, because they thought it would attack the ducks in the mill-pool.

Mr. Oswald Crawford, in his book, 'A Year of Sport' (published in 1895), says 20 lbs. is a good weight for an Otter. The Gouleeby specimen, however, was a very large one, as it turned the scale at 31 lbs. The Thimbleby Otter was a young one, and only weighed 13 lbs. The skin of the Thimbleby specimen—possibly stretched in the curing—though a young one, is 50 inches in length from snout to tip of tail. The Gouleeby one, though older, was said to be 47 inches long. Mrs. Flover, of Clarence House, Horncastle, has a stuffed Otter, also shot in the Bain some years ago, between Martin and Scrivelsby. I measured it a few days ago, and found it to be 42 inches long. I may say that in the North of Scotland, where Otters are still numerous, they do a good deal of damage among the salmon. They are rather dainty, and, as a rule, only eat a slice out of the shoulder of the fish, in its thickest and fattest part. I have frequently seen a dead salmon lying on the bank of a river which I fish in Sutherlandshire, with just this slice eaten out of the shoulder; and I once hooked a salmon, and, after a very hard fight, landed it, of which part of the shoulder had been eaten away. It had probably been caught by an Otter, which had, at once, eaten its meal of fresh salmon, and then left it for dead; but the fish had jerked itself back into the water; and, having been thus caught once, it fought the harder with me against being caught again. —J. CONWAY WALTER, Langton Rectory, Horncastle, 18th August 1898.

CHEMICAL NOTES ON LAKE DISTRICT ROCKS.

II.—INTRUSIVE AND SEDIMENTARY ROCKS.

ALFRED HARKER, M.A., F.G.S.,

St. John's College, Cambridge.

In the former part of this paper I have collected the available chemical data relative to the 'contemporaneous' or bedded volcanic rocks, lavas and tuffs, of the Borrowdale Series. I proceed now to perform a like office for the intrusive rocks of the district, though here I have but little to add to the information already published.

While some of the intrusions are probably of Ordovician age and connected with the same period of igneous activity as the volcanic series which they often traverse, others certainly belong to later dates. The granites and the lamprophyres, for instance, must be referred to the Old Red Sandstone period, or at least to the interval between the Silurian and the Old Red Sandstone, while the Carrock Fell rocks, and perhaps certain others, may be still younger. In the case of many of the minor intrusions it is scarcely possible to obtain any direct evidence as to their precise age.

Beginning with the granites and allied rocks, we have five complete analyses by Mr. J. Hughes of the principal masses of acid intrusive rocks in the districts. The silica-percentages, quoted from Clifton Ward's papers,* are given under the numbers (61), (62), (71), (72), and (80). Of the Shap granite Ward gave no analysis, but three complete analyses by Dr. J. B. Cohen, (67) to (69), and two silica-percentages by Mr. E. J. Garwood, (66) and (70), are given in a paper on that rock by Harker and Marr.† Nos. (63) to (65) and (73) to (79) are from a paper by the present writer on the Carrock Fell granophyre and the Grainsgill greisen.‡ Of these, (65) and (73) are from complete analyses by Mr. L. J. Spencer and Mr. G. Barrow, respectively, while the rest are silica-determinations only. Nos. (63), (76), and (79) were made by Messrs. W. A. Brend and E. H. Cunningham Craig; (64) in the laboratory of Owens

* Quart. Journ. Geol. Soc., vol. xxxi., p. 597, 1875; vol. xxxii., pp. 5, 7, 22-24, 1876.

† Ibid, vol. xlvii., pp. 275, 276, 278, 280, 1891.

‡ Ibid, vol. li., pp. 125-147, 1895.

College, Manchester, under Dr. Harden; (77) and (78) at the Yorkshire College of Science, under Dr. Cohen.

(61). 73·573. Eskdale granite, S. of Great How.

(62). 75·223. Skiddaw granite, White Gill. A specimen from near here gave sp.gr. 2·624.

(63). 77·26. Skiddaw granite, bed of Caldew, 300 yards above Grainsgill; sp.gr. 2·604.

(64). 78·13. Greisen, near foot of Brandy Gill; sp.gr. 2·646.

(65). 80·36. Greisen, Combe Height, 250 yards S. of Grainsgill; sp.gr. 2·684.

(66). 69·78. Shap granite, sp.gr. 2·687.

(67). 68·55. Shap granite, bulk analysis.

(68). 65·41. Large porphyritic felspars of the same.

(69). 68·89. Ground-mass of the same.

(70). 56·95. Dark patch in Shap granite; sp.gr. 2·769.

(71). 71·442. Buttermere granophyre, Scale Force.

(72). 69·044. Carrock Fell granophyre, summit of Carrock Fell. A specimen from here gave sp.gr. 2·657.

(73). 71·60. Carrock Fell granophyre, 100 yards E. of summit; sp.gr. 2·670.

(74). 67·79. Plagioclase felspar of the same; calculated from analysis (65).

(75). 49·47. Augite of the same; calculated from (65).

(76). 77·38. Carrock Fell granophyre, below Scurth and 500 yards W.N.W. of Stone Ends; sp.gr. 2·607.

(77). 75·3. Carrock Fell granophyre, in peat-moss S. of Drygill Head; sp.gr. 2·530.

(78). 60·0. Carrock Fell granophyre, close to gabbro and modified by gabbro material, Furthergill Sike; sp.gr. 2·805.

(79). 58·26. Another specimen of the same.

(80). 67·180. St. John's quartz-felsite (microgranite), Threlkeld. A specimen from here gave sp.gr. 2·63.

By a loosely-worded sentence in the Survey Memoir this last analysis (80) is attached to the Armboth and Helvellyn dykes, and some confusion has arisen in consequence (e.g., in Teall's 'British Petrography,' p. 343). The rock analysed was from Threlkeld, as I have verified from Ward's original specimen in the Keswick Museum.

Of the basic intrusions Ward gave an analysis by Hughes of the Carrock Fell gabbro only (loc. cit. p. 24). A silica-percentage of this rock was sent me by the late Mr. Tate, but the want of a precise locality makes this of little value, for

I have shown that this rock varies in a very remarkable degree in different parts of the mass.* Hughes' silica-percentage is given here under (81) and Tate's under (82). My paper contains two analyses by Mr. G. Barrow (83) and (92), and eight determinations of silica-percentages, (84) to (91). Of these Nos. (85) to (89) were made by Brend and Cunningham Craig; (84), (90), and (91) by students of the Yorkshire College of Science. As regards analysis (92), it may be observed that, as published in the Quarterly Journal, it is incomplete. The missing constituents are alumina 20·64 (probably too high), lime 4·30, soda 3·18, potash traces, ignition (sulphur) 3·00. To the gabbro I append two of the small dykes and veins which intersect both that rock and the adjacent granophyre. Of these (93) is from a complete analysis by Mr. R. H. Adie,† and (94) is a silica-percentage from the Yorkshire College.‡

(81). 56·656. Carrock Fell gabbro, White Crags.

(82). 53·9. Carrock Fell gabbro.

(83). 53·50. Carrock Fell gabbro, roadside, 150 yards N.N.W. of Chapel Stone; sp.gr. 2·800.

(84). 50·0. Carrock Fell gabbro, same locality.

(85). 59·46. Carrock Fell gabbro, White Crags; sp.gr. 2·804.

(86). 57·7. Carrock Fell gabbro, 350 yards S. of White Crags; sp.gr. 2·877.

(87). 50·22. Carrock Fell gabbro, 600 yards S.W. by S. of White Crags; sp.gr. 2·939.

(88). 47·11. Carrock Fell gabbro, 120 yards N. of summit of White Crags; sp.gr. 2·848.

(89). 44·14. Carrock Fell gabbro, top of cliff above Mosedale, S. edge of mass; sp.gr. 3·103.

(90). 43·4. Carrock Fell gabbro, gill ⅜ mile N.W. of Swineside, S. edge of mass; sp.gr. 2·952.

(91). 33·4. Carrock Fell gabbro, lower part of Furthergill, N. edge of mass; sp.gr. 3·200.

(92). 32·53. Carrock Fell gabbro, upper part of Furthergill, N. edge of mass; sp.gr. 3·265.

(93). 53·63. Spherulitic tachylyte vein cutting Carrock Fell gabbro; sp.gr. 2·99.

(94). 59·8. Variolitic andesite dyke cutting Carrock Fell granophyre; sp.gr. 2·763.

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* Quart. Journ. Geol. Soc., vol. l., pp. 311-336, 1894.

† Groom, Quart. Journ. Geol. Soc., vol. xlv., p. 298, 1889.

‡ Harker, Geol. Mag. for 1894, p. 553.

Of the diabases of the Lake District and adjoining country we have the following analyses:—No. (95) is by Dr. R. Hellon;* (96) to (98), of a much decomposed rock of doubtful relations at Gleaston-in-Furness, by Sir H. Roscoe;† (99) by Mr. Hutchings,‡ silica-percentage only.

(95). 48·42. Diabase, Robin Hood, Bassenthwaite.
(96). 45·54. Diabase, Gleaston, Low Furness.
(97). 50·96. Another specimen of the same.
(98). 51·10. Another specimen of the same. The rock where freshest gave sp.gr. 2·92.
(99). 45·65. Diabase, above Easedale Tarn, towards Langdale; sp.gr. 2·95.

In the paper just cited Mr. Hutchings also gives silica-percentages of two rocks of intermediate composition (pp. 537, 544). No. (100) seems to be an example of the less acid quartz-porphyries or quartz-porphyrites common as small intrusions in some parts of the district; (101) is a less usual type of rock.

(100). 60·45. 'Quartz-andesite or dacite' (quartz-porphyrite), Between Greenburn and Wythburn; sp.gr. 2·74.
(101). 61·15. 'Trachyte' (porphyry), Shap Wells Plantation.

Eight analyses (by F. T. S. Houghton) are given in a paper by Prof. Bonney and Mr. Houghton 'On Some Mica-traps from the Kendal and Sedbergh Districts.'§ The silica-percentages are cited below in numerical order, (102) to (109). It is to be noted that most of these rocks have suffered considerably from decomposition. Under (110) to (113) I give some figures from four analyses communicated to me by the late Mr. Thos. Tate. These, too, are lamprophyre dykes. Nos. (110), (111) are duplicate analyses of a dyke at Helm Gill; (103) is from another specimen of the same; and (104) is from 'Phillips' dyke' at Ingleton, 'the best preserved of all the West Yorkshire traps.'

(102). 61·12. Mica-lamprophyre, Kendal road, 250 yards from third milestone.
(103). 58·34. Mica-lamprophyre, S. of Haygarth, Docker Fell.
(104). 49·52. Hornblende-lamprophyre, Stile End Farm, 5 miles N. of Staveley.
(105). 48·57. Mica-lamprophyre, railway, W. of Docker Garth.
(106). 47·88. Mica-lamprophyre, Docker Fell; probably a different dyke from No. (103).
(107). 46·17. Hornblende-lamprophyre, Gill Bank, 1¼ miles N.N.E. of Staveley.

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* Postlethwaite, Quart. Journ. Geol. Soc., vol. xlix., p. 533, 1893.
† Binney, Mem. Lit. Phil. Soc. Manch. (3), vol. iv., p. 93, 1871.
‡ Geol. Mag. for 1891, p. 538.
§ Quart. Journ. Geol. Soc., vol. xxxv., pp. 165-179, 1879.

(108). 44·44. Mica-lamprophyre, railway-cutting, ¾ mile from Windermere Station.

(109). 32·31. Mica-lamprophyre, Helm Gill, near Sedbergh, lowest dyke; a much decomposed rock.

(110). 47·2. Mica-lamprophyre, Helm Gill, 'the most southerly dyke.'

(111). 47·1. The same, duplicate analysis.

(112). 46·34. The same, another specimen.

(113). 58·99. Mica-lamprophyre, E. bank of Doe, Storrs, Ingleton.

These last four analyses have not been published, and are accordingly given in full below. Since Mr. Tate's chemical work on the Yorkshire lamprophyres seems otherwise to be lost,* I am glad to be able to preserve a portion of it here. He had further made analyses or partial analyses of a variety of rocks from the Lake District proper, and intended † to give the results in this journal, but that design was never carried into effect. In analyses (110) to (112) the 'difference' represents water and carbonic acid. Since these constituents are not likely to be negligeable in a rock of this group, it is probable that analysis (113) was made on material already ignited.

	(110) Helm Gill.	(111) Helm Gill.	(112) Helm Gill.	(113) Ingleton.
Silica	47·2	47·1	46·34	58·99
Alumina	19·6	19·7	16·47	9·79
Ferric oxide ...	2·5	2·2	4·08	10·07
Ferrous oxide ...	—	—	—	4·96
Manganous oxide	—	—	0·25	0·20
Magnesia... ...	5·7	5·9	3·54	2·30
Lime	11·1	11·2	12·13	6·74
Soda	3·8	4·0	4·53	3·78
Potash	2·2	2·3	4·35	3·81
Difference ...	7·9	7·6	8·31	—
	100·0	100·0	100·00	100·64

There remain only a few analyses of sedimentary rocks and their metamorphosed representatives. The numerous analyses of metalliferous ores scattered through mining literature are regarded as outside the scope of our subject, and analyses of minerals are excluded for the same reason. Six complete analyses of rocks from the Skiddaw Slate group have been published, and their silica-percentages are reproduced below for

* Proc. Yorks. Geol. Pol. Soc. (N.S.), vol. xiii., p. 352, 1898.

† Naturalist for 1892, p. 240.

reference. Of these the first four, by Mr. J. Hughes, are from Ward's paper (pp. 22, 23, 5, 7); No. (118) is from Mr. J. D. Kendall's 'Mineral Veins of the Lake District,'* where it is given without any precise locality; and (119), by Dr. Hellon, is published by Mr. Postlethwaite (loc. cit.).

(114). 54·480. Altered Skiddaw slate, summit of Red Pike, near the Buttermere Granophyre.
(115). 65·725. Chiastolite-slate, How Gill, Skiddaw.
(116). 54·448. Spotted schist, Skiddaw Forest.
(117). 53·174. Mica-schist, close to Skiddaw granite, Sinen Gill.
(118). 56·76. Skiddaw slates, 'the argillaceous beds'; sp.gr. 2·64.
(119). 79·92. Grit in Skiddaw slates, Robin Hood, Bassenthwaite.

Finally we have two analyses of Coniston Flags by Mr. Hutchings.†

(120). 58·55. Coniston flags, Wasdale Beck, near Shap Wells.
(121). 61·05. Coniston flags, highly metamorphosed, Wasdale Beck, ¾ mile above Shap Wells.

I append a few specific gravity determinations of Lake District rocks not yet examined chemically.

2·638. Quartz-felsite, intrusive, N. of Wansfell.
2·615. Spherulitic granophyre, Armboth dyke, W. of Middlesteads.
2·598. Felsite dyke, Tod Gill, Caldbeck Fells.
2·675. Mica-lamprophyre, the most easterly dyke, Cronkley, Teesdale.
2·712. Mica-lamprophyre, Long Sleddale, S.W. of Buckbarrow Crag; the most southerly of four dykes near sheepfold.
2·732. Mica-lamprophyre, the most northerly of the same group.
2·581. Felsite enclosed in preceding.
2·706. Coniston limestone, E. of Spring Wood, Dalton-in-Furness.
2·732. Calcareous breccia in Coniston limestone, Waterblain Quarry, Millom.
2·709. Coniston limestone, bed next above preceding.

Corrigendum: p. 56, line 1, for 74·88 *read* 74·58.

Addendum: p. 55, last line of text, add A specimen from the Mosedale Quarry gave sp.gr. 2·711.

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* Trans. Manch. Geol. Soc., vol. xvii., p. 295, 1884.

† Geol. Mag. for 1894, p. 42.

THE SOUTHWARD MOVEMENT OF BEACH-MATERIAL ACROSS THE HUMBER GAP.

ALFRED HARKER, M.A., F.G.S.,
St. John's College, Cambridge.

Some time ago, in correspondence with Mr. F. M. Burton, I ventured to point out that much greater caution is needed in dealing with boulders on the Lincolnshire than on the Yorkshire coast; and I expressed the opinion that the southward movement of the beach-material is here an important factor, the Lincolnshire boulders being probably derived to a large extent from Holderness. In a paper published in 'The Naturalist' for last year (pp. 133-138) Mr. Burton quoted this opinion, but dissented from it. He now, in the April number, returns to the subject, fortified by the support of two engineer authorities, Mr. W. H. Wheeler and Mr. A. Atkinson.

To the facts adduced by these gentlemen I do not take any exception, but in the conclusions drawn from those facts certain essential considerations seem to be left out of account. The beach movement is admitted. Mr. Wheeler, indeed, objects to my expression 'powerful tidal scour,' and here I am willing to accept emendation; but as he tells us that 'there is a drift of material along the beach from N. to S.,' and again that 'the banking up of the shingle and also the travel along the shore is due entirely to tidal action,' our difference is evidently one of words only. That there is such a travel, not only of sand but of coarse shingle and boulders, is a fact patent to the most casual observer. It is also certain that the amount of such transport was much greater formerly than it has been during the last thirty or forty years, when groynes have been erected at numerous points and the artificial removal of shingle prohibited.

Now, I have not, as Mr. Atkinson suggests, 'overlooked the existence of the wide and deep embouchure of the Humber'; but, as Mr. Burton remarks in another connection, it is not with the present day only that we have to deal. 'There is no drift across the Humber,' says Mr. Wheeler. 'This drift collects at Spurn Point.' True, but it is manifest that this process cannot go on indefinitely. Mr. Clement Reid, in the Geological Survey Memoir, 'The Geology of Holderness,' estimates the average growth of Spurn Point during the last 200 years at 13½ yards per annum; less under the present artificial conditions, but

formerly more. It is a matter of history that this spit of shingle, now more than three miles long, is the growth of the last three centuries. In 1586, the date of Camden's 'Magna Britannia,' it did not exist. What, then, has become of the millions of tons of material swept southward along the Holderness coast prior to that time? There is only one possible answer: it is distributed along the coast south of the Humber.

The cycle of events which must have recurred many times since the Glacial Period, when this district was formed, is easily deduced from Mr. Wheeler's own observations, and has been clearly set forth by the geologist quoted above. 'A beach begins to form at Spurn, as it did in Camden's time, the point lengthens more and more, the neck becomes thin, the sea breaks through, and a bank of shingle becomes detached. Then the north channel becomes wider and wider, as the sea and wind drive the island southward, like any other part of the beach, till at last the bank is transferred from Yorkshire to Lincolnshire, and the process recommences.'

Clement Reid points to the existence of a very large shingle beach near Donna Nook, on the south side of the Humber mouth, which can only have been derived from the other side of the estuary; but there are many vanished Spurn Points to account for, and it cannot be doubted that the material from them is scattered along the coast from the Humber to the Wash at least. Hence, while not denying the possibility that some of the boulders on the Lincolnshire coast may have a different source, I adhere to the view that many, and probably the large majority, of them are derived from the waste of the Holderness cliffs.

NOTE—GEOLOGY.

Lake District Rocks: Additional Note.—The following specific gravities of rocks in the Ordovician Volcanic Series are additional to those given in my papers on the Chemistry of Lake District Rocks (Nat., Feb. 1899, pp. 53-58, and May 1899, pp. 149-154).

2·746. Gatherstone Head, Black Sail Pass: porphyritic basalt, felspars partly epidotized.
2·744. Eycott Hill: basalt, apparently No. 16 of Ward's section.
2·738. Mirk Gill: lava.
2·735. Brund Gill, Helvellyn, N.E. of sheep-fold: lava.
2·715. Greenup Gill, above 600 feet contour-line: garnetiferous lava.
2·672. Rosgill Moor, overlooking Swindale, Shap: andesite.
2·671. E. of Grange Bridge, Borrowdale: andesite.
2·616. Summit of Kidsty Pike: nodule in rhyolite.
2·565. About ¼ m. N.E. of Applethwaite Common: rhyolite.

—ALFRED HARKER, Cambridge, 1st April 1899.

In Memoriam.

HENRY THOMAS SOPPITT.

On the first day of April, while the singing birds cheered us and the bursting buds gladdened our eyes, proclaiming present spring, there passed from us one to whom all the sights and sounds of Nature were dear and familiar—one who was (alas,

alas, that the tense must be a past one!) himself familiar and dear to many of the naturalist brotherhood in Yorkshire and elsewhere.

Henry Thomas Soppitt died on that day at Halifax in his 41st year, and his too early death is mourned not by personal friends only, for his labours had made him widely known among mycological botanists everywhere, and there are probably few

who are competent to resume and continue the work which has thus fallen from his hand.

Mr. Soppitt's short life has not been an eventful one. He was born in Bradford on 21st June 1858. His father was an estimable man and a philanthropist, but not very prosperous in business. In his father's trade and afterwards in a drysalter's establishment at Halifax, Soppitt's days were spent in earning his livelihood. One of his friends writes that 'his life was only one long struggle with adverse circumstances'—that 'he had a hard life of uncongenial toil for his daily bread.' In some respects this is, no doubt, too sadly true; yet who can measure the happiness which he found in his chosen pursuits?

He early became a naturalist. In fact, all the manifestations of Nature were equally congenial to him, and it was circumstances, rather than any especial preference, which made him chiefly a botanist. The Lepidoptera were his first love, and he was a most diligent collector and student of all the moths and butterflies which the neighbourhood of Bradford could yield, until, finding his energies too limited, he turned to botany and speedily became thoroughly acquainted with British flowering-plants. Compelled by his business to be at work during the daytime, he would rise early on the summer mornings and so get an hour or two in the fields (often in the company of the present President of the Yorkshire Naturalists' Union, Mr. W. West) before the day's labour began. In 1876 Soppitt joined the Bradford Naturalists' Society; in 1880 he became its botanical recorder, and in 1886 its President. He was for many years one of the executive of the Yorkshire Naturalists' Union. As an instance of his thoroughness it may here be recorded that, discovering and justly appreciating the difficulty of the grasses and the sedges, he gave up one entire summer to them, studying them only in his rambles, and not meddling with other herbs. Then, encouraged by the persuasion of his friend, Mr. West, by the ex cathedrâ exhortations of another President of the Naturalists' Union, the late Dr. Williamson, and by the open, almost unoccupied, field, he was led to the study of the fungi, for which his great powers of observation and his wonderful patience and perseverance alike fitted him.

Soppitt did not, however, confine his diligence to the vegetable kingdom, for (to parody the words of Bacon) he may be said to have taken all natural history to be his province. He was well acquainted with our native shells. 'The Land and Freshwater Mollusca of Upper Airedale,' written in collaboration with his friend, Mr. J. W. Carter, was published in this journal, and among his contributions to the Bradford Press, for which he

was in the habit of writing frequent articles on nature topics, are 'A List of the Mammals of the Bradford District' and 'Our Local Reptiles.' He was a true lover of birds, and knew those that came within his ken as one knows one's friends. To the writer's knowledge he recently made two, if not three, inconvenient journeys (involving in his much-occupied life very early starting and very late returning, besides the night vigil in the open air) in order to hear the Nightingale and the Grasshopper-Warbler sing, and he would talk of their notes with rapture as though he had listened to the songs of the blessed souls.

But Soppitt's true vocation was recognised when he began the study of the parasitic fungi. It was to the minute rusts and moulds which appear on many of our native plants that he turned his attention - with what success a great authority, Dr. Plowright, shall speak:—

'Some ten or twelve years ago Soppitt began the biological study of the Uredineæ, and it is from his experimental researches that we know the life-history of several species which had previously either been shrouded in mystery or wrongly interpreted. For instance, prior to his work the *Puccinia* and *Æcidium* on *Adoxa moschatellina* were regarded as being of the same species, but he demonstrated that the *Puccinia* is a *Micropuccinia*, and has no relation to *Puccinia albescens*, which is an *Anteupuccinia* with *Æcidium*, *Uredo* and teleutospores on the same plant. Then he cleared up the life-history of *Æcidium leucospermum*, showing it to be an *Endophyllum*. He found its spores germinated as those of *Endophyllum* do, and that, while they were without effect upon adult plants, yet seedling Anemones became affected with the *Æcidium* after infection, and that the fungus had nothing whatever to do with the *Puccinia fusca* which occurs on the same host-plant. It fell to his lot to be the first person to demonstrate a heterœcious which has its æcidiospores on a Dicotyledon; this he did in working out the life-history of *P. bistortæ*, by proving that its æcidiospores occur on *Conopodium denudatum*. He attacked that complicated problem, the life history of the Puccineæ on *Phalaris arundinacea*, proving that the *Æcidium* on Lily of the Valley belonged to one of them, which he named *P. digraphidis*, thereby opening a discussion amongst Continental botanists as to the relative value of these specific forms which has hardly yet been concluded. His communications to 'The Gardeners' Chronicle' were mostly upon plant diseases, the last being an account of his repetition and confirmation of Klebahn's cultures of *P. Pringsheimiana* on the garden

Gooseberry. *Lactarius involutus* Sopp. is figured in Cooke's 'Illustrations,' t. 1194. *Dasycypha Soppittia* Mass. is named after him, as also is the genus *Soppittella,* one of the Thelephoreæ. His last paper, in conjunction with Mr. Crossland, appeared in the January number of 'The Naturalist,' and contained descriptions of several new species of Discomycetes.'

For two or three years before his death Soppitt worked on the fungi of the Halifax district with Mr. Chas. Crossland, and some of the results of this joint labour are yet to be published.

It is to be regretted in the interests of science that Soppitt was not left at leisure to prosecute his investigations. Men of his perception, and of like industry and enthusiasm, are not so common among us that they can be neglected with impunity, and our indifference to them is likely to cost us dear. We see a fungus threaten our forests and imperil our timber supply; the phylloxera beggars a province, and microscopic organisms decimate our large cities; yet we will not learn to value those whose work might save us from such disasters.

Mr. Soppitt was a man of a thoroughly human and amiable disposition, and had that keen sense of humour which is often the inheritance of Yorkshiremen, and which not seldom enables them to ride merrily over many a wave of ill-luck. 'Devoid of personal jealousy, and ever free to impart the information he possessed to others,' says a fellow worker, 'no wonder he made many friends.' In truth, to be in the open field with him under the blue sky was to a nature-lover a liberal education. The glorious sun itself did not beam more brightly than did his face as he noted each herb and tree and flower, each bird, beast, and insect, and poured out of his full brain words of wisdom about them all. He was a naturalist alike in head and in heart. On the hills, and in the meadows and woods, he was in full sympathy with his surroundings. Nothing was strange to him. He had made them all his own by his love of them. They were his by the peaceful right of intellectual conquest. The joys of Nature were his to the full. A few short weeks passed with him in the Alps will ever be green and pleasant in the writer's remembrance. So fitted was he by disposition and culture for such scenes that this foreign mountain-land seemed to belong to him by right rather than to its natural inhabitants.

Thus this erstwhile joyous springtide opens but sadly for some of us. The summer, indeed, is coming, the birds and the bees and the flowers; the days will be long and the heavens will be bright; we doubt not that wood and field and fell will again be as lovely and as fragrant as heretofore; but shall we find them so, wanting our friend?

A. H. P.

FLORA OF CUMBERLAND.

ARTHUR BENNETT, F.L.S.,
Croydon, Surrey.

In the 'Journal of Botany' for May 1899 (p. 225), I called attention to a few omissions in Mr. Hodgson's interesting book; here it will, perhaps, be allowable to enter more fully into particulars, as many may not have access to the authorities.

Astragalus glycyphyllus. Culgaith Pike, Keswick; Winch, Contributions to the Flora of Cumberland, 1833. This is one of Hutchinson's History of Cumberland localities; but the plant is found in Westmorland and Northumberland, so is likely to occur.

Potentilla verna. Bank Wood. Contrib. lc., also from Hutchinson. Mr. Britten, quoting from Mr. Watson's MSS. in the British Museum, says Mr. Watson gives 'Hill between Borrowdale and Newlands,' adding later '*P. alpestris?*' In Top. Botany he still gives Cumberland under *P. verna*; and under *P. alpestris* has 'Cumberland!' In the New Botanist's Guide, p. 313 (1835), he records it from 'Rocks between Newlands and Borrowdale, facing to the former (doubtful whether this or the next),' i.e., *P. verna*. The later work thus giving it definitely as *P. alpestris*. Whether *P. verna* as well as *P. alpestris* occurs must be left to future explorers to ascertain.

Stalice bahusiensis. In Top. Botany, p. 341, Mr. Watson gives it for 'Cumberland, Heysham sp.' I have seen a specimen in Dr. Boswell-Syme's herbarium, now in Mr. Hanbury's possession.

Rumex domesticus. Also Hutchinson's History. Given in Top. Botany with a ? Not an unlikely species to occur, as it is found in the neighbouring counties.

Goodyera repens. 'Fir plantation near the Eden at Armathwaite, possibly introduced with seedling fir trees. On "the Borders," it is spreading with the plantations.' F. A. Lees in Record Club Report for 1879, p. 72 (1880). This plant has been found in Yorkshire, J. of Botany, p. 379, 1888 (J. J. Marshall), Naturalist, p. 312, 1888 (Messrs. West and Slater). In Norfolk in two seemingly wild stations, but whether accidentally or intentionally introduced or not, it is difficult to believe it a native there. Recorded in Trans. Norwich and Norfolk Society, p. 720, 1889, by Mr. Geldart. It is also reported for Northumberland.

Epipactis violacea. Cumberland. Bab. MS. Top. Botany, p. 385. The records in Top. Botany must nearly all be verified again, as to what was intended. Mr. Watson makes the name *violacea* a synonym of *E. media* Bab. But how many of the counties produce the *E. violacea* Boreau it is impossible to say; in fact our forms of *Epipactis* need a careful revision. I quite agree with the remarks of the Rev. W. H. Purchas in the Journal of Botany, p. 201, 1885, where he expresses doubts of the Herefordshire plant being the same as the Yorkshire.* Of this I possess an original specimen, and one can quite see why Prof. Babington named it *E. ovalis* (English Botany Supp. t. 2884). But to my eyes a large number of the specimens so named are only varieties of either *violacea* or *latifolia*. They require special care to dry the flowers separate, and with not too much pressure.

Potamogeton Zizii Roth. No doubt the Derwentwater record of *P. lucens* refers to this, as, I believe, Mr. Bailey so named the specimens when he gathered them; but it is given as *Zizii* in Top. Botany, ed. 2.

Lastrea rigida. Mr. Hodgson mentions this, and numbers it, but gives no locality and no remarks as to its introduction into the 'Flora.'

There are some other species reported for Cumberland not given by Mr. Hodgson; but as Mr. Watson does not admit them in Top. Botany only in the 'doubtful' plants, they may well be left.

NOTES—BOTANY.

***Lobelia Dortmanna* in Lakeland.** — As the habitat of this beautiful flower is being discussed, I should like to say that I saw many specimens growing in Lake Windermere, between Bowood Hotel and Ambleside, in the shallows. This was in July 1894. —W. A. Shuffrey, Arncliffe Vicarage, Skipton, 1st April 1899.

Vernacular Plant-names: Bullace. —Mr. Hey, in his very interesting paper on 'Plant-names in use at West Ayton,' says: — 'Mr. Blakeborough, in his new book on North Yorkshire, informs us in the glossary under "Bullace" that the Bullace is a wild Plum of a green colour when ripe. To me they appear to be purple black.' It will interest Mr. Hey to know that the 'Bullace' here is as described by Mr. Blakeborough, i.e., green in colour when ripe. Several of these trees grow at Arncliffe Cote, between here and Kilnsey. The Bullaces make a very good preserve when ripe. I have seen a 'purple black' variety in Langstrothdale, but the tree was probably *Prunus fruticans* of Mr. F. Arnold Lees' 'Flora of West Yorkshire,' 1st ed., p. 785. —W. A. Shuffrey, Arncliffe Vicarage, Skipton, 1st April 1899.

* See also Flora of Herefordshire, p. 298 (with plate), 1889.

VERNACULAR NAMES IN NORTH YORKSHIRE.

J. J. BURTON,

Rosecroft, Nunthorpe, R.S.O., Yorkshire.

I HAVE been greatly interested in the articles and notes which have recently appeared on local bird and plant names, and I am exceedingly glad that there is a movement for permanently putting these on record, as my own observation leads me to believe that in another generation many of them will have become obsolete. The schoolmaster is abroad, and the whole country is being planed down scholastically to the dead level of Whitehall requirements, and many names expressive of characteristics are from some mistaken notion of vulgarity being rapidly eliminated from the country schoolboy's vocabulary. The migratory instinct recently developed in the countryman, fostered by the improved means of inter-communication between town and country as well as between different rural districts, is also slowly but surely destroying that distinctly local flavour in the manners, customs, and language of the last generation of country folk.

To aid in the preservation of such local names as still exist I would like to add a few to those which have already appeared, as well as give some variants of the same.

In the Rev. W. C. Hey's list he says he has not found any name for the Elm. In some parts near York this tree is always called 'Oam,' with a full round sound. The Bramble is known as 'Bummelkite.' The Cow Parsnip is in its young, leafy state called 'Kelks,' and when in flower 'Humlocks.' It is very curious how widespread is the practice of using the common name of the Elder adjectively. The wood, flower, and fruit are used for many purposes, but I cannot recall ever having heard the word 'Bottery' used alone.

The fruit of the Hawthorn is 'Cathaw,' and that of the Dog Rose, 'Chub.' Acorns are 'Yakruns.' *Ononis arvensis* is only known as 'Cat-Whin,' and *Cardamine pratensis* as 'Bird Eye.' *Anthemis cotula* and *Matricaria chamomilla* are called 'Dog-finkle.' *Papaver Rhœas* is 'Cockrose,' and *Lychnis Githago* is 'Popple.' The Meadow Orchis is 'Crowsfoot,' *Lotus corniculatus* 'Bird's-foot,' and *Tussilago Farfara* 'Calf's-foot'—elsewhere 'Colt's-foot.' The Arum is known only as 'Cows and Calves,' and the Yellow Iris as 'Segs.' *Brassica sinapis* is 'Ketlock' near York and 'Runch' in Cleveland. The fruit of

Malva rotundifolia is 'Cheese-cakes,' the plant itself being apparently without a name. Tares are 'Lints.' The *Bunium flexuosum* given as Yennets by Mr. Hey is near York 'Jack Jennets,' and as a boy I have dug up and eaten the tuberous root scores of times. Why, I do not know, unless it was that they were not ordinary articles of diet; but I must have seen others do it. *Erica Tetralix* is known only as 'Crow-ling.' Mountain Ash is, besides 'Witchwood,' mentioned by Mr. Hey, also 'Touchwood.' Potatoes are 'Taties,' and often 'Spuds.' Rye with many of the old folk is 'Mazlishun,' and in my young days it was seldom called by any other name; but both in cultivation and name it is now getting into disuse.

Mr. Blakeborough is quite right about 'Wicks,' but 'Wick-wood' is the commoner term. The troublesome running roots of grass are also called 'Wicks,' but more generally 'Wickens.' The Dandelion is 'Pisimire Flower,' and the Wild Chicory is 'Swine Thistle.' The *Briza* is 'Doddering Jocks,' or 'Doddering Grass,' and the *Chrysanthemum Leucanthemum* is 'Dog Daisy.' Another plant, common in some places, which, if my memory serves me right is one of the Polygonums, is called 'Red Shanks,' and has this interesting tradition attached to it, that when Abel was slain by his brother, some drops of his blood fell upon the leaves of this plant, hence the dark spots now seen thereon.

I would like to add one or two variants on the bird- and other names given. Blackbeeraway is often 'Batbeeraway.' Goldie is always 'Gowlie' in some places, where also the Blackbird is always called 'Blackie,' and the Moorhen 'Waterhen.' The Woodpigeon is indifferently called 'Woodie,' 'Cushat,' and 'Stockdove'; a generation ago it was frequently called 'Cowscot,' and there are places near Loftus-in-Cleveland still bearing the old names of 'Cowscot Gill' and 'Cowscot Wood.' 'Gyp Starnel' is shortened to 'Gyp,' which is doubtless only a North Riding form of the West Riding 'Shep,' allowing for the differences of pronunciation of the same dialect words observable in places even near to each other. The Weasel is called 'Clubster' in some parts of Cleveland.

NOTE—FLOWERING PLANTS.

***Ranunculus Lenormandi* in the Trent Basin near Doncaster.**—Last year I recorded *R. Lenormandi* from Martin Beck Wood, a station in the Trent drainage area and just within the York County boundary. To-day I gathered the plant in another locality about five and a half miles S.W. of Doncaster, and at 50 feet above sea level.—H. H. CORBETT, 9, Priory Place, Doncaster, 1st May 1899.

Naturalist.

HYMENOPTERA SESSILIVENTRES

OF THE COUNTIES OF

NOTTINGHAMSHIRE AND LINCOLNSHIRE:

A PRELIMINARY LIST.

Rev. ALFRED THORNLEY, M.A., F.L.S., F.E.S.,

Vicar of South Leverton, Notts.

The following short but interesting list of Saw-flies taken in the counties of Nottinghamshire and Lincolnshire will, it is hoped, direct the attention of entomologists once more to this exceedingly interesting group. The combined lists contain an aggregate of about 56 species, some of which may prove new to science and some new to Great Britain. Further, this list would have been quite impossible but for the great pains and trouble taken over the specimens by the Rev. F. D. Morice, of Woking, a well-known student of the Order. Not only has Mr. Morice seen the bulk of the specimens recorded, but has sent away all doubtful examples to Pastor Konow, of Teschendorf, Mecklenburg, an expert of European fame. To these two workers entomologists in our counties owe a very great debt of gratitude. As Saw-flies are commonly taken in the sweeping-net, I should be glad if our naturalists would let me have any specimens to look at, thus taken. Nor, because a species occurs abundantly in a certain locality, let them think that therefore it is a common one. There is no need to set out these insects. Larger species may be stuck on tall pins, near the top; and small species on very fine ones, which may then be inserted on a tiny slip of card, through which a larger pin passes. A little judicious blowing after the insect is set on the pin will cause the wings to separate a little, thus exposing these latter organs and the body better. The larvæ, which are very like caterpillars, mostly feed exposed on various plants and shrubs, and can easily be reared. The phenomenon of parthenogenesis is of very common occurrence in this group, and of many species only the females are known. As a rule, they are very pretty insects, and many species occur commonly almost everywhere; and as they do not possess a sting, in spite of their menacing appearance, they may be freely handled. I need hardly say, that any specimens collected should have a neat and accurate label attached, giving place and date of capture.

June 1899.

In the following lists, thirty species are to be credited to Nottinghamshire; and fifty to Lincolnshire. This is due to the greater number of workers in the latter county; and in some measure to the more varied character of the collecting grounds.

NOTTINGHAMSHIRE.

Sirex gigas L. Worksop, 'where it occurs regularly' (E. G. Alderson, Ent., Oct. 1893, p. 303). Chilwell, 'common there' (Douglas H. Pearson, Ent., Nov. 1892, p. 291). Grove, one ♂ (Rev. G. Shipton). South Leverton, one ♀ in my greenhouse, about 1887; two ♀s brought to me 28th June and 22nd July 1898 (Thornley).

Sirex juvencus L. Worksop, twice (E. G. Alderson, Ent., Oct. 1891, p. 248). Chilwell, 8th October 1892 (Douglas H. Pearson, Ent., Nov. 1892, p. 291).

Trichiosoma lucorum L. South Leverton, one ♂, 1895 (Thornley).

Trichiosoma tibialis Steph. (=***betuleti*** Cam.). South Leverton, two ♂s, May 1896 (Thornley).

Pamphilius depressus Vill. South Leverton, one ♂, about 1895 (Thornley).

Pamphilius sylvaticus L. South Leverton, two ♂s, 1896 (Thornley).

Tenthredo atra L. South Leverton, one ♀, var. ***dispar*** Klug, May 1896 (Thornley).

Tenthredopsis campestris L. Treswell Wood, one ♀ (var.), 27th June 1898 (Thornley).

NOTE.—This species is the *scutellaris* of Panzer.

Tenthredopsis spec. nov. South Leverton, two examples, May and June 1897 (Thornley).

Tenthredopsis litterata Geoff. South Leverton, one ♂, July 1898 (Thornley).

NOTE.—Mr. Morice remarks that this is the true male of *cordata*, *microcephala*, etc.; see Ent. Mo. Mag., Sept. 1897.

Tenthredopsis tiliæ Pz. (=***raddatzi*** Konow). South Leverton, May 1897. Retford, July 1896 (Thornley).

Pachyprotasis rapæ L. South Leverton, May, July, Aug. 1896 (Thornley).

Macrophya ribis Schr. South Leverton, one ♀, July 1897 (Thornley).

Allantus arcuatus Först. South Leverton, very common on *Umbelliferæ*. Treswell Wood, with var. ***nitidior,*** 21st July 1897 (Thornley).

Allantus vespa Retz. Treswell Wood, two ♂s, 21st and 30th July 1897 (Thornley).

Rhogogastera aucupariæ Klug. Nuthall, one ♂, 1898 (Freestone). Broxstowe, one ♀, 1898 (Freestone).

Rhogogastera lateralis F. South Leverton, two ♀s, May and June 1896 (Thornley). Lambley, 1898 (Freestone).

Selandria serva F. South Leverton, 2 ♀s, May 1896 (Thornley).

Pœcilosoma tridens Knw. South Leverton, one example, 7th May 1898 (Thornley).

Emphytus cinctus L. South Leverton, one ♂, May; 1 ♀, June 1897 (Thornley). Not uncommon this year, 1898 (Thornley).

Athalia rosæ L. South Leverton, June 1897 (Thornley). Treswell (Thornley). Retford (Thornley).

Priophorus padi L. South Leverton, two examples, ♂s, May and June 1896; one ♀, 1897 (Thornley).

Monophadnus albipes Gm. South Leverton, one ♀, June 1897 (Thornley). Treswell Wood, one ♀, 27th June 1898 (Thornley).

Dolerus æneus L. Common, South Leverton (Thornley). Retford (Pegler). Gedling, 21st April 1898 (J. W. Carr).

Dolerus gonager F. South Leverton, one ♀, May 1896; one ♂, May 1897 (Thornley). Nottingham, 21st May 1898 (J. W. Carr).

Dolerus lateritius Klug. Retford, one example, 1896 (Pegler).

Dolerus pratensis Thoms. Sutton (Retford), one example, 1896 (Thornley).

Pachynematus capreæ Pz. South Leverton, one ♀, May 1896 (Thornley).

Pachynematus sp. nov. (or incog.). South Leverton, one ♀, June 1896 (Thornley).

Holocneme lucida Pz. South Leverton, four ♀s, May and June 1896 and 1897 (Thornley).

LINCOLNSHIRE.

Sirex gigas L. Kirton-in-Lindsey (C. F. George, Science Gossip, Nov. 1886, p. 250). Gainsborough, 'One just emerged from pupa,' 5th July 1859 (E. Tearle, Ent. Wkly. Intell., 16th July 1859, p. 273). Lincolnshire, in the year 1887, an unusual number of *S. gigas* occurred in the county (H. B. Wilson, in 'The Naturalist,' March 1896, p. 60).

Belton (Grantham), three examples, all ♀s, July and Sept. 1896 (Miss F. Woolward). Market Rasen, two ♀s, 1898 (Peacock). Ashby, two ♀s and one ♂ (Dr. Cassal). Brigg, 12th July 1898, one ♀ (Peacock).

Sirex juvencus L. Kirton-in-Lindsey (C. F. George, Science Gossip, Nov. 1886, p. 259). Tothill near Alford, one ♀, 18th Sept. 1889 (J. E. Mason). Belton near Grantham, one ♀, 9th Sept. 1896 (Miss F. Woolward).

Tenthredo atra L. Torksey, one ♂, June 1897 (S. Pegler).

Tenthredo livida L. Cadney, four examples, 1898 (Peacock and Thornley). Ashby, three examples, 1898 (Dr. Cassal).

Tenthredo mandibularis Pz. Freshney Bogs, Great Cotes, one ♀, 13th July 1898 (Thornley).

Tenthredo mesomelæna L. Ashby, one example, 1898 (Dr. Cassal). Cadney, seven examples, 1898 (Peacock and Thornley).

Tenthredopsis campestris L. = (***scutellaris*** Pz.). Scotton Common, one ♂, 1898 (Peacock). Cadney, 1898 (Peacock). Epworth, 14th July 1898 (Thornley). Torksey, June 1897, one ♀ (Thornley).

Tenthredopsis coqueberti Klug. Great Cotes, 21st June 1898, one example (Thornley). Cadney, one ♀, 1898 (Peacock). Freshney Bogs, Great Cotes, one example, 13th July 1898 (Thornley). Mablethorpe, three ♀s, June 1897 (Thornley). Torksey, one ♂, June 1896 (Thornley).

Tenthredopsis dorsalis Lep. Mablethorpe, one ♀, June 1897 (Thornley).

Tenthredopsis dorsivittata Cam. Great Cotes, 21st June 1898 (Thornley).

Tenthredopsis litterata Geoff. Theddlethorpe, two ♂s, June 1896 (Thornley). Ashby, one var. ***'caliginosa,'*** 1898 (Dr. Cassal). Cadney, two var. ***'cordata,'*** 1898 (Peacock and Thornley). See earlier note about this species, A. T.

Tenthredopsis tiliæ Pz. (= ***raddatzi*** Knw. = ***sagmaria*** Knw.). Mablethorpe, June 1897 (Thornley). Torksey, June 1897 (Thornley). Great Cotes, 21st June 1898 (Thornley).

Tenthredopsis sp. nov. Theddlethorpe, June 1896 (Thornley). Mablethorpe, June 1897 (Thornley). These examples are in the hands of Pastor Konow.

Rhogogastera aucupariæ Klug (= ***gibbosa*** Cam.). Louth. Recorded as *Tenthredo aucupariæ* by H. Wallis Kew, in 'The Naturalist,' Sept. 1886, p. 276.

Rhogogastera lateralis Fab. Linwood Warren, one ♂, 1898 (Peacock). Cadney, one example, 1898 (Peacock).

Rhogogastera punctulata Klug. Great Cotes, one example, 21st June 1898 (Thornley). Cadney, two examples, 1898 (Peacock).

Rhogogastera viridis L. Scotton Common, four examples, 22nd June 1898 (Thornley).

Allantus arcuatus Föst. Torksey, common as early as May (Thornley). Cadney, 1898 (Peacock). Great Cotes and Freshney Bogs, 21st June 1898 (Thornley).

Allantus tenulus Scop. Cadney, one ♂ + two ♀s, 1898 (Peacock and Thornley).

Allantus vespa Retz. Ashby, one example, 1898 (Dr. Cassal).

Athalia rosæ L. Grimsby, June 1896 (Thornley). Mablethorpe, June 1896 and 1897 (Thornley). Theddlethorpe, June 1896 and 1897 (Thornley). Linwood Warren, one ♀, 1898 (Peacock).

Blennocampa tenuicornis Kl. Cadney, one example, var. ***humeralis*** = *alchemillæ* Cam., March 1898 (Peacock).

Cephus pallipes Htg. (= ***phthisicus*** Fab.). Great Cotes, 21st June 1898, one ♀ (Thornley).

Cephus pygmæus L. Mablethorpe, several specimens picked up half drowned on the shore, June 1897 (Thornley). Cadney, common, both ♂ and ♀, June 1898 (Peacock and Thornley). Freshney Bogs, Great Cotes, 13th July 1898 (Thornley).

Dolerus gonager Fab. Theddlethorpe, June 1896 (Thornley). Cadney, 1898 (Peacock). Linwood Warren, 1898 (Peacock). Great Cotes and Freshney Bogs, 21st June 1898 (Thornley). Louth (H. Wallis Kew, Nat., Sept. 1886, p. 276).

Dolerus æneus L. Torksey, May 1896 (Thornley). Theddlethorpe, June 1896 (Thornley).

Dolerus hæmatodes Schr. Cadney, one example (Peacock).

Dolerus lateritius Klug. Theddlethorpe, June 1896 (Thornley). Cadney, 1898 (Peacock). Linwood Warren, 1898 (Peacock).

Dolerus pratensis L. Freshney Bogs, Great Cotes, one ♀, 13th July 1898 (Thornley). Cadney, one ♂, March 1898 (Peacock). South Kelsey, 1898 (Peacock). Epworth, 14th July 1898, two examples (Peacock and Thornley).

Dineura nigricans Chr. (***viridedorsata*** Cam.). Scotton Common, one ♀, 22nd June 1898 (Thornley).

Emphytus cingulatus Scop. Cadney, 1898 (Peacock).

Emphytus rufocinctus Retz. Cadney, two ♂s, 1898 (Peacock).

Emphytus serotinus Klug. (var. ***tarsatus*** Zett.). Somerby, 2nd Oct. 1897, one example (Peacock).

Monophadnus albipes Gmel. Hibaldstow, one ♀, 1898 (Peacock).

Pachynematus capreæ Pz. Theddlethorpe, one ♀, June 1896 (Thornley).

Pachynematus sp. nov. (allied to above). Theddlethorpe, three examples, June 1896 (Thornley).

Pachyprotasis rapæ L. Torksey, one ♀, Aug. 1897 (Thornley).

Pœcilosoma longicornis Thoms. Linwood Warren, one ♂, 1898 (Peacock).

Pristiphora (***Nematus*** pars) ***pallidiventris*** Fall. Theddlethorpe, one ♀, June 1896 (Thornley).

Pteronus (***Nematus***) ***myosotidis*** F. Cadney, one ♂, 1898 (Peacock).

Pteronus (***Nematus***) ***ribesii*** Scop. Cadney, one ♂ and one ♀, 1898 (Peacock).

Selandria interstitialis Th. (= ***sixii*** Cam.). Theddlethorpe, both ♂s and ♀s, common, June 1896 (Thornley).

Selandria serva F. Mablethorpe, common in June (Thornley). Theddlethorpe, common in June (Thornley). Torksey, not uncommon (Thornley).

Taxonus glabratus Fall. Mablethorpe, two ♂s, June 1897 (Thornley). Theddlethorpe, one ♂, June 1896 (Thornley). Torksey, one ♂, May 1896 (Thornley).

Tomostethus fuliginosus Schr. Freshney Bogs, Great Cotes, one ♀, 14th July 1898 (Thornley).

Tomostethus gagathinus Kl. Great Cotes, 21st June 1898, one ♂ (Thornley).

Tomostethus luteiventris Kl. (= ***fuscipennis*** Fall.). Great Cotes, one ♀, 21st June 1898 (Thornley). Scotton Common, one ♀, 1898 (Peacock).

Tomostethus nigritus Fab. Theddlethorpe, one ♀, June 1896 (Thornley).

Amauronematus vittatus Lep. Scotton Common, one ♀, (Peacock).

Macrophya ribis Schr. Cadney, 1898 (Peacock).

NOTE—BOTANY.

Bortree or Bottery-Bush = the Elder.—In reply to Rev. W. C. Hey, the name Bortree or Bortree-bush is common enough in the north of England and in Scotland, in various spellings. Without going into the bibliography of the matter, a few references may be of interest. Halliwell (Dict. Archaic and Provincial Words, ed. i., 1847, p. 221) gives a reference to the 'Promptorium Parvulorum,' p. 137, an English-Latin dictionary, compiled, I believe, in 1440 by one of the Dominicans, or Black Friars, of Bishops Lynn, Norfolk, and also a quotation from 'MS. Lincoln Med.,' f. 286. Here it is Bur-tree. In the abridgment of Jamieson's 'Scottish Dictionary,' 1846, p. 80, col. 2, 'Borral Tree supposed the Bourtree,' and on 84, 'Bourtree Bush, Boretree, Bountree, N. of Eng. Burtree,' and states it is so called because boys bore it, or in some manner extract the pith for their pop-guns. Napier, 'Folklore of West Scotland,' 1879, gives the name as 'Bourtree.' I lately lived in a house named from the Elder, Bortree Stile, just outside Ulverston. I do not know what trust is to be placed in the following, but give it as a curiosity:—1640. Parkinson, 'Theatre of Plants,' p. 209. He says, 'In Latin Sambucus, of Sambix as it is thought the first thereof; but Quintus Serenus calleth it Sũbucus in his verses, and thought to be derived from Sabucus or Sambucus as Hermolaus saith, which is an hollow instrument of music, called also Peetis, etc., Magadis.' This is, I suppose, a 'pipe'? The local pronunciation in N. Lancashire and Cumberland is Bur-tree, hence Bottery = Bortree. I have no access to the 'Oxford Eng. Dict.' or Bretton and Holland's 'Plant Names,' but no doubt the question is thrashed out there.—S. L. Petty, Ulverston, 1st April 1899.

NOTE—MAMMALIA.

Badgers in Lincolnshire. I exhibited to the Lincolnshire Naturalists' Union at Woodhall Spa the skin of a Badger (*Meles meles*), killed at Woodhall. They used to be common on the Kirkby Moor, near Woodhall Spa, but are now quite extinct there. I do not know whether Mr. Hawley has any in his woods, but they still survive (I think Mr. Skipworth could tell us) in the rocks at Holbeck. This one was caught by some boys in a large rabbit hole on my land, within a hundred yards of the blacksmith's shop at Woodhall Spa. I have another specimen stuffed, which was killed at some rabbit holes on the Horncastle Canal bank, between Martin and Scrivelsby. It is, again I would say, a great pity that these last representatives of wild nature should be killed off wherever they are seen. The badger especially the only representative of the bear family in England is quite harmless. Though found sometimes in rabbit holes, it is not there to eat the rabbits; its usual diet being mice, frogs, beetles, snails, an occasional hedgehog, and vegetable roots. As I mentioned in 1897 at Holbeck, the badger is very cleanly in its habits; and although it is not an uncommon thing for a fox to harbour in a badger's burrow, it is to the advantage of the fox, which is anything but a tidy creature, and brings dead chickens and all sorts of carrion to his den, and leaves them there to rot, whereby he sometimes gets mangy; but the badger sweeps out the home like a tidy housemaid, and so contributes to its healthiness. It was only yesterday that I read in an interesting book, published this year (1898), 'Hunting Reminiscences,' by Alfred E. Pease, M.P., in a chapter on Badger Hunting, the following remarks:—'Apart from shaving brushes, the Badger has his uses. He is a destroyer of wasps and small vermin, and an excellent maker of fox-earths. In countries where mange in foxes has become a scourge, the preservation of badgers would do much to remove this plague, for they are wonderful cleansers of earths.' The skin is 2 feet 10 inches in length, and my stuffed specimen is about the same. J. Conway Walter, Langton Rectory, Horncastle, 18th Aug. 1898.

NOTES—MAMMALIA.

Badger near Tadcaster.—I have in my possession a living example of *Meles meles* which was caught in my grounds at the Castle Hill, on 14th Feb.; it is a female, weighing 12 lbs., and apparently about 2½ years old; the day before its capture a dog badger was shot about twelve or fourteen miles further up the river Wharfe, after a fight with a keeper's dog.—W. CALLUM, Grammar School, Tadcaster, 11th May, 1899.

White (Albino) Hares near Horncastle.—I presented a white Hare (*Lepus europæus*) and two Leverets to our museum in Lincoln Castle two years ago. Specimens of these albinos have been seen in this neighbourhood, to my knowledge, for many years. It would be some time in the 'fifties' that there was one in my parish of Langton. As a boy I tried to get it, but it was shot in the next parish, Thimbleby. On Kirkby Moor I once shot a brace, right and left, which got up together, with white face, breast, and forelegs. One of these I have stuffed. Of late years they have increased in number and have been found over a much extended area. Our friend, Mr. Fieldsend, has taken much interest in this subject, and made extensive inquiries in various directions. He sent a letter on the subject to the 'Field' newspaper, but the columns of that paper were so crowded with reports of cricket matches, etc., that they very much cut down his interesting communication. He has, however, kindly lent to me some of the letters which he received, and the substance of them may be briefly stated thus:—

An albino Hare was shot by the Rev. R. W. Otter, in Ranby, on 19th October 1860; Mr. Otter also reports that two were seen in the parish of Clayworth, near Bawtry, in 1896.

Major Egerton, shooting with Mr. Vyner's party, in Baumber, 17th September 1896, shot one.

One was shot by Mr. Charles Leslie Melville, in Branston, in September 1895; and one or two were shot in Bracebridge about the same time.

My own specimen was shot in Woodhall in 1896; and one was shot by Captain Mason, of Mr. Edmund Turnor's shooting party, in Wispington, in the same year.

One was shot at Thorpe Tinley, in the parish of Timberland, on Mr. J. D. Bowling's shooting, of Thorpe Tinley Hall, on 19th October 1897 (with slight tinge of brown on the tips of the ears); and in May of this year (1898) there was still one frequently to be seen in the same place, and one was shot in Timberland parish in 1895.

I have not heard of any being seen in my own neighbourhood this year, but the poaching has been so excessive that, though hares were fairly plentiful last year, we have now hardly a hare left. In fact, it has been said that the only hare in my parish is a tame one which I have in a cage with two rabbits: as I am trying myself to get a hybrid between the two.

Of course we all hear of isolated cases of albinos of various kinds; and I may here say that my friend, the well-known Nottinghamshire naturalist, Mr. J. Whitaker, of Rainsworth Lodge, Mansfield, has a large collection of albinos, which he has made his special study. We hear of white Rooks, white Sparrows, etc. White Partridges were shot last year not far from Louth; and a friend of mine, Colonel Fenton, a great Indian sportsman, who was selected some years ago to act as shikari to the Prince of Wales on His Royal Highness's visit to India, last year shot a white Blackbuck, in Kattiwar, in the western province of Bombay.

I have here a buff Blackbird (*Turdus merula*) caught in my own garden at Woodhall Spa; buff broods were produced two years in succession by, I suppose, the same brown hen. Two years ago a buff Hare was shot near Bourne, in this county.

The above data will show, however, that the Albino Hare is not so great a rarity as has been supposed, and that it is found over a large area in this neighbourhood.—J. CONWAY WALTER, Langton Rectory, Horncastle, 16th August 1898.

BIRD-NOTES FROM THE HUMBER DISTRICT.

JOHN CORDEAUX, J.P., F.R.G.S., M.B.O.U.,

Great Cotes House, R.S.O., Lincoln; Ex-President of the Yorkshire and Lincolnshire Naturalists' Unions.

(Continued from 'The Naturalist' for February 1899, p. 35.)

Pugnacity of Redbreast. Recently, when writing, I observed two cock Robins on the lawn desperately fighting, their feet locked and rolling about. When I next looked one had flown, the other remained, a little puffed-out ball of feathers, on the grass. I found it was quite dead; smoothing its feathers, I placed it in quite a natural position on some moss of a rockery near the window, intending to instruct my little granddaughter in the art of putting salt on a bird's tail. The dead Robin, however, had not been long in this position before it was furiously attacked by another, presumably the victor; feathers were struck from its head and the body thrown to the ground, and the determined small assailant executing a sort of war dance in the air or flutter above the body. We are so accustomed to associate the 'messenger of calm-decay' with Christmas cards and 'peace on earth,' that this exhibition of vindictiveness towards a possible rival was a proof that there is more than one side to the Redbreast's character.

Coccothraustes vulgaris Pallas. **Hawfinch.** ***Pyrrhula europæa*** Vieillot. **Bullfinch.** On 28th January I saw a Hawfinch and Bullfinch on the same curved shoot of the wild rose regaling themselves with hips.

On 11th February, when rabbit-shooting with Mr. Haigh in one of his covers, I noticed during the day scores of Bullfinches, also several Hawfinches; the latter were quickly on the wing, collecting near the top of some high ash, otherwise they did not seem greatly disturbed by the noise. The cover was just such a haunt as the Hawfinch loves, old hawthorns and much thick blackthorn and gorse, with here and there a solitary forest tree.

Grey Geese. 10th and 11th February. Mr. Haigh says the coastguard of North Cotes saw many pass over at this date.

Sturnus vulgaris L. **Starling.** 12th March. A very warm, summer-like day. There were about a score of Starlings on the wing over the house from 12.30 to 2 p.m. taking flies. The air was full of these insects, which appeared to be about the size of the hawthorn fly.

Anas boscas L. **Wild Duck.** 1st April. I saw twelve pair to-day, male and female together, dabbling in the tide edge of the Humber.

Rallus aquaticus L. **Water Rail.** 4th April. One struck Flamborough light soon after midnight and was killed. On the same night, and about the same hour, two Golden-crested Wrens. A remarkably fine Woodcock also killed against one of the wires near Filey Station on night of 4th.

Saxicola œnanthe (L.). **Wheatear.** 1st to 4th April. First arrivals on Yorkshire coast. A very considerable immigration at the Spurn, Flamborough, Filey Brigg, and Scarborough Castle Hill; at the two latter observed by Mr. W. J. Clarke.

On 3rd May, at Great Cotes, I saw two pair, males and females, of the handsome large tree-perching race, which each year in May pass northward through this district, presumably en route for Iceland and Greenland.

Regulus cristatus K. L. Koch. **Golden-crested Wren.** In the last week of March and early in April quite a number about in the coast districts on their spring migration. On 1st April I saw one caught in the main street of Grimsby.

On 21st April there was a swarm of Golden-crested Wrens at Flamborough, filling the hedges, and on the 18th and subsequently many also at Easington, in the Spurn district, some being picked up dead, suggestive of an unfavourable passage of the North Sea. The wind N.E., and hazy during the period. This is the first time I have had to record an immigration of these little wanderers in the spring.

Uria troile (L.). **Guillemot.** Mr. Bailey told me (4th April) that a pure white Guillemot had been picked up at sea off Flamborough, but too much decayed to make anything of. Another recently seen by the fishermen had white wings.

Syrrhaptes paradoxus Pallas. **Sand-grouse.** A flight of thirty, or about that number, continued to frequent a retired and lonely locality on the Lincolnshire North Wolds from the last week in February to the 23rd or 25th of March. Here they were frequently seen by competent observers who were well acquainted with the birds in 1888. On the present occasion their chief haunt was a sandy field on the same farm where they were first seen in 1888, and it was here I picked up some of their body feathers at one of the dusting places. The birds got much tamer during the

severe arctic weather in March, resorting to the vicinity of a row of wheat stacks on the slope of the wold. They were not seen after the break-up of the storm.

I have fairly reliable evidence from a man who shot some in 1888 that a small flight were seen at Flamborough in March. The probability is that they have left the country altogether, none having been so far recorded in any other part of Great Britain. Since writing this a friend sends word that on 19th May he saw a single Sand-grouse on his property; this is the adjoining parish on the Lincolnshire Wolds to that in which they were first seen. A small flight also near Easington on 13th May, as Mr. Loten informs me.

Charadrius pluvialis L. **Golden Plover.** 25th March. Some large flocks in summer plumage on grass and wheat lands in the middle marsh; they left before April came in.

Numenius arquata (L.). **Curlew.** Very abundant in flocks, both inland and on the coast in the last week in March; 20 to 100.

Upupa epops L. Hoopoe. 18th April. One seen at Kilnsea near the Spurn.

Eudromias morinellus (L.). **Dotterel.** 1st May. This beautiful spring visitor appears to become scarcer every year. At this date one was killed against the road-side telegraph wire at Skeffling, near Easington, and taken to Mr. Philip Loten. This bird has a melancholy interest, for it is mentioned in the very last note sent me by the late Mr. H. B. Hewetson, as dictated by him to his nurse a few days before his death.

Plectrophenax nivalis (L.). **Snow Bunting.** 3rd May. Mr. Bailey saw one at Flamborough. This is a very late occurrence.

Arrival of Summer Migrants.—8th April, Cuckow (Flamborough), 12th April (Easington), seen; 1st April, Wheatear; 20th April, Swallow (Great Cotes); 21st April, Common Whitethroat and Redstart (Flamborough); 29th April, House Martin and Whinchat (Great Cotes); 3rd May, Yellow Wagtail; 4th May, Lesser Whitethroat; 6th May, Spotted Flycatcher; 11th May, Sand Martin, in great numbers; 13th May, Reed and Sedge Warblers, most abundant in willow holts; 14th May, Swifts; 19th May, Garden Warbler; all these latter at Great Cotes.

Fuligula marila (L). **Scaup.** 20th May. I noticed one adult male and female off the sluice in this parish this morning, also some small flocks of the Common Scoter, male and female, all adult. Further out in the river some other ducks, probably—from their size, colour, and pose on the water—*Fuligula cristata.*

Limosa lapponica (L.). **Bar-tailed Godwit.** 20th May. A small flock boring the muds along the tide edge; no red-breasted birds amongst them.

Muscicapa atricapilla L. **Pied Flycatcher.** Mr. Philip Loten says—in litt.—a considerable number the last fortnight and up to the 19th May near and about Easington.

NOTES—ORNITHOLOGY.

Kingfisher within City-limits, Lincoln.—In the year 1897 a pair of Kingfishers (*Alcedo ispida* L.) bred in the rockery overhanging an artificial pool containing Trout (*Salmo fario* L.) in the garden of Mr. C. J. Fox, Lindum Terrace, in the city of Lincoln. They reared a brood of four and left in the autumn of that year. Nothing was seen of them in 1898, but in January of this year a pair again appeared at the same place. This is interesting to note, inasmuch as the house, though surrounded by a walled garden, is well within the city limits, and passers by are frequent. I had the information from Mr. Fox himself, and have myself seen the spot.—Jas. Eardley Mason, Kenmare, Ireland, April 1899.

Nidification of Woodpeckers near Harrogate.—Last year (1898) I found the Greater Spotted Woodpecker (*Dendrocopus major*) nesting in Haverah Park, and near to it, not more than thirty yards away, the Green Woodpecker (*Gecinus viridis*) also had its nest.

This year, near to Woodhall Bridge, I found the nest of the Lesser Spotted Woodpecker (*Dendrocopus minor*) and that of the Green Woodpecker in different limbs of the same tree. The *Picus minor* I have not found nesting in this neighbourhood before. I watched it for at least half an hour, and saw it several times enter its nesting hole.

I think the breeding of the Lesser Spotted Woodpecker in this neighbourhood is worth recording.—Kenneth McLean, Pennine View, Harrogate, 1st May 1899.

Horncastle Bird-notes.—In walking to Tumby a fortnight ago, along the Horncastle Canal, I put up a Green Sandpiper (*Helodromas ochropus*), the only one I have seen this year. A few of these birds and some other birds seem to pass over us and stay a few days with us on their course in migrating early in August. Most years lately I have seen two or three of them, putting them up at solitary ponds.

The next day after seeing the Green Sandpiper, I put up a Snipe (*Gallinago gallinago*) from a pond in one of my fields in Langton. I did not see a single Snipe last winter, but this was evidently on its passage, and probably only stayed a day, as I have not seen it again.

A flight of Wild Ducks (*Anas boschas*) also passed over a few days ago, and a large flock of Green Plover (*Vanellus vanellus*). The Wild Duck, I may say, occasionally nests in the ling on Kirkby Moor, away from all water, and I once knew Teal (*Querquedula crecca*) do so also.—J. Conway Walter, Langton Rectory, Horncastle, 18th August 1898.

NOTES SUPPLEMENTARY TO THE FLORA OF DERBYSHIRE, INCLUDING THE MOSSES.

Rev. W. H. PAINTER,

Stirchley Rectory, near Shifnal, Corresponding Member of the Birmingham Natural History and Philosophical Society, and of the Birmingham Microscopists' and Naturalists' Union.

Since the publication, in 1889, of my 'Contribution to the Flora of Derbyshire,' several plants have been discovered in the county, and additional habitats have been obtained through the diligence of resident botanists; hence the time has come for the publication of these supplementary notes.

The arrangement and nomenclature of the plants in the following pages are the same as those of my book above mentioned, and to facilitate reference I have quoted the number of each plant recorded, as well as the page of the book on which it occurs. I have also given, where necessary, as synonyms, the names which have appeared in the ninth edition of the London Catalogue of British Plants, where they differ from those given above. These synonyms are printed in italics.

I am indebted to the Rev. R. C. Bindley, Vicar of Mickleover, for some additional plants and habitats, to the Rev. Hilderic Friend, of Tipton, Staffordshire, and Mr. Thomas Fox, of Sheffield, for much information respecting plants growing in the eastern part of the county. The names of these three botanists are placed against the plants recorded on their authority.

The reports of 'The Exchange Club for the British Isles' for the years 1890-6 have been examined for Derbyshire plants mentioned in them, and are quoted under the letters B.E.C. The names of the Revs. E. F. and W. R. Linton frequently appear in connection with these reports. When *Linton* only is given, the latter gentleman is intended, as his name occurs very often, and to him I am indebted for many specimens, especially of the Rubi. I am also indebted to Dr. Focke, of Bremen, and to the Rev. W. Moyle Rogers for reporting on the Rubi.

In my book several plants were quoted from the 'Topographical Botany' of Mr. H. C. Watson, without any authority being given; but latterly I have been able to trace the authorities upon which that author relied, and these are now given.

The following books are added to those mentioned in my 'Contribution' in connection with the Bibliography of the botany of this county:—

1640. Theatrum Botanicum ; J. Parkinson.
1650. Phytologia Britannica ; W. How.
1666. Pinax Rerum Naturalium Britannicarum ; C. Merrett.
1855. Wilson's Bryologia Britannica.
1882-96. Braithwaite's British Moss Flora.
1886. Handbook to the Peak of Derbyshire, by W. H. Robertson, M.D., with a Botanical Commentary, etc., by Miss Hawkins.

Correspondence with some of the friends who co-operated with me in compilation has brought to light various errors, some of them my own. The more important of these are corrected in the following pages. Here I seize the opportunity of expressing my regret that the name of my friend, the late Mr. J. Whittaker, of Morley, was not included amongst those who assisted me in compiling my book.

Since the publication of my 'Flora,' I have had to deplore the decease of five of the botanists who took an active part with me in compiling it, viz. :—

Mr. J. Hagger, F.L.S., Repton, deceased March 1st, 1895, whose Herbarium is now at University College, Nottingham.
Mr. J. T. Harris, Burton-on-Trent, deceased Oct. 3rd, 1892.
Rev. J. C. Hassé, Ockbrook, deceased December 12th, 1894.
Mr. J. Whitehead, Oldham, deceased May 6th, 1896.
Mr. J. Whittaker, Morley, deceased March 2nd, 1894, whose Herbarium is now in the Museum, Derby.

With three of them, Mr. Hagger, the Rev. J. C. Hassé, and Mr. Whittaker, I was more intimately associated than with the others, and the memory of the pleasant intercourse that I had with them will be always fresh with me. Thus the stream of time flows on ; thus one labourer follows another ; but happy are those who exchange earthly for heavenly service in the presence of God !

In my 'Contribution' no mention was made of the Mosses growing in Derbyshire. This defect is now remedied. These 'Supplementary Notes' include not only those found by Mr. Whitehead in the northern part of the county, but the Rev. A. Ley has placed at my disposal notes upon those he met with in the neighbourhood of Buxton, etc., between the years 1871-80, whilst the Rev. R. C. Bindley above-mentioned has handed me a list of those observed by him chiefly in the neighbourhood of Derby. To these I have added a few found by myself in various parts of Derbyshire, all of which have been submitted to Mr. Whitehead. Against these the above names have been placed, whilst the usual sign ! appears against those seen by me.

The Census of Plants for Derbyshire now stands thus:

TYPES OF DISTRIBUTION.

British	486	
English	222	
Germanic...	14	
Highland...	9	
Scottish	29	
Atlantic	3	
Intermediate	16	
Local	3	
		— 782

Specimens of nearly all the plants recorded in my 'Contribution,' and in the following 'Notes,' have been placed in the Derby Museum, and my own collection will now be presented to the British Museum.

PHANEROGAMIA.

1. ***Clematis Vitalba*** L. Page 11. III. Muggington!

11. ***Ranunculus circinatus*** Sibth. Page 12.
II. Spinkhill, near Chesterfield, *C. Waterfall.*
III. Between Stanton-by-Dale and Dale Abbey!

11. ***Ranunculus fluitans*** Lam. Page 12.
I. Bradwell, *Fox.* III. Brailsford, *Linton*, E. C. Report, p. 398. Between Chellaston and Swarkestone!

12. ***Ranunculus Lenormandi*** F. Schultz. Page 13.
III. Mickleover, *Bindley.*

13. ***Ranunculus hederaceus*** L. Page 13.
I. Bradwell, *Fox.* III. Mickleover, *Bindley.*

16. ***Ranunculus Lingua*** L. Page 13.
I. Cottage Pond, Chatsworth, *Gem of the Peak.*
II. South Normanton, *Coke* in Pilkington.
III. Ingleby, *Glover*; formerly at Woodville, *Nat. Hist Tutbury.*

18. ***Ranunculus auricomus*** L. Page 13.
II. Hague Lane, Renishaw, *Waterfall.*
III. Near Sudbury!

23. ***Ranunculus sceleratus*** L. Page 13.
III. Mickleover, *Bindley.*

25. ***Ranunculus arvensis*** L. Page 14.
III. Mickleover, *Bindley.*

26. ***Caltha palustris*** L. Page 14.

New. VAR. ***Guerangerii*** (Boreau).
III. Bradley, *Linton*, B. E. C. Report, pp. 244 and 399.

29. ***Helleborus viridis*** L. Page 15.
I. Dovedale, *C. T. Green.* Near Ashbourne, *Bindley.*

Delphinium Ajacis Reichb. Page 15.
III. Repton, *Hagger.*

35. ***Berberis vulgaris*** L. Page 15.
II. Millhouses, near Sheffield, *Fox.*

41. ***Papaver dubium*** L. Page 16. VAR. ***Lamottei*** (Bor.).
III. Findern, *Bindley.* Swarkestone!

42. ***Papaver Rhœas*** L. Page 16.
III. Repton, *Hagger*; Mickleover, *Bindley.*

45. ***Chelidonium majus*** L. Page 16.
III. Mickleover, Etwall, *Bindley.*

48. ***Corydalis*** (***Neckeria***) ***claviculata*** DC. (N.E.Br.). Page 16.
I. Grindleford, *Fox.* III. Near Muggington!

51. ***Fumaria officinalis*** L. Page 16.
I. Norton, near Sheffield, *Fox.*
II. Near Chesterfield, *Fox.* III. Repton, *Hagger.*

58. ***Coronopus Ruellii*** Gaertn. (All). Page 17.
III. Mickleover, *Bindley.*

60. ***Thlaspi arvense*** L. Page 17. III. Stapenhill, *Harris.*

70. ***Lepidium campestre*** L. (R.Br.). Page 18.
I. Matlock Bath!

72. ***Cochlearia officinalis*** L. Page 18.
VAR. ***alpina*** Wats.
I. Pindale, near Castleton; Bradwell Dale, *Fox.*

78. ***Draba muralis*** L. Page 19. I. Dovedale, *Bindley.*

79. ***Draba verna*** L. (*Erophila vulgaris* DC.).
III. Mickleover, *Bindley.*

84. ***Cardamine amara*** L. Page 19.
I. Haddon; Cromford, *Bindley.*
II. Canal Bank, Renishaw, *Waterfall.*
III. Mackworth! Between Duffield and Ireton! Repton, *Bindley.*

86B. ***Cardamine sylvatica*** Link. (*C. flexuosa* With.). Page 19.
III. Breadsall!

87. ***Cardamine impatiens*** L. Page 20. I. Monsal Dale.

88. ***Arabis Thaliana*** L. (*Sisymbrium Thalianum* J.Gay). P. 20.
I. Cromford; Dovedale, *Bindley.* Matlock Bath!
III. Anchor Church, *Bindley.*

Arabis petræa. I. Middleton Dale, *Mr. Coke* in Bot. Guide.

[***Arabis albida*** Stew. Rocks opposite High Tor, Matlock Bath, *Hind, J. B.* High Tor; well established!]

98. ***Nasturtium officinale*** R.Br. Page 20.
I. Bradwell, *Fox*. III. Mickleover; Radbourne, *Bindley*.
Chellaston! Near Breadsall Priory!

99. ***Nasturtium terrestre*** R.Br. (*N. palustre* DC.). Page 21.
III. Mickleover, *Bindley*.

100. ***Nasturtium sylvestre*** R.Br. Page 21.
II. Between Renishaw and Eckington, *Waterfall*.

101. ***Nasturtium amphibium*** R.Br. Page 21.
III. Canal, Findern, *Bindley*.

106. ***Erysimum cheiranthoides*** L. Page 21.
III. Cultivated ground, Mickleover, *Bindley*.

123. ***Raphanus Raphanistrum*** L. Page 22.
III. Between Etwall and Willington, *Hagger*. Not Repton, as in Flora.

125. ***Reseda Luteola*** L. Page 22.
II. Stretley, near Shireoaks, *Fox*.

133. ***Viola odorata*** L. Page 23.
II. Renishaw; Staveley, etc., *Waterfall*. Nr. Norton, *Fox*.
f. ***alba*** (Lange) non *Besser*. II. Near Norton, *Fox*.

135. ***Viola sylvatica*** Fries. var. ***Riviana*** R. (*V. Riviana* Reich.). Page 23. III. Quarndon! Morley!
Viola Riviniana Rchb. × ***sylvestris*** Rchb.
III. Hollington, near Shirley, *Linton*, B. E. C. Rep., p. 325.
Viola canina Auct. Markeaton Wood, *Glover's History*.

137. ***Viola lutea*** Huds. Page 24.
I. Bradwell Hills; Bradwell Edge; Castleton, *Fox*.
VAR. ***amœna*** Syme. (Symons). I. Matlock Bath, *Smith*.
Drosera longifolia L. (*anglica* Huds.).
I. Abney Moor; East Moor; Moors near Buxton, *Gem of the Peak*.

141. ***Polygala vulgaris*** L. Page 24.
I. Grindleford; Bradwell, *Fox*.

141. ***Polygala depressa*** Wender (*serpyllacea* Weihe). Page 25.
I. Cromford Dale! III. Repton Rocks, *Hagger*; Morley!

146. ***Dianthus Armeria*** L. Page 25.
II. The Hague, Renishaw, *Waterfall*.

152. ***Silene inflata*** Smith (*S. Cucubalus* Wibel). Page 25.
II. Cresswell, *Fox*. III. Mickleover, *Bindley*.

156. ***Silene nutans*** L. Page 25.
I. Flag Dale, near Buxton, *C. T. Green*.

165. ***Lychnis Githago*** Scop. Page 26.
I. Brough. II. Norton, *Fox*. III. Mickleover, *Bindley*.

171. ***Sagina nodosa*** E. Meyer (Finzl.). Page 26.
I. Near Heights of Abraham, Matlock Bath, *Waterfall.*

172. ***Spergula arvensis*** L. Page 27.
III. About Repton, *Hagger*; Mickleover, *Bindley.*

178. ***Arenaria serpyllifolia*** L. Page 27.
III. Turnditch! Mickleover, *Bindley.*
VAR. ***leptoclados*** (Guss.). III. Wall, Knowl Hills, *Bindley.*

179. ***Arenaria tenuifolia*** L. Page 27.
I. The record in my book, 'Miller's Dale, *Whittaker*,' should read, '*Whitehead*,' and the other record, 'Heights of Abraham, Matlock Bath,' was an error of the recorder.

180. ***Arenaria verna*** L. Page 27.
I. Bradwell, *Fox*; Wirksworth, *Bindley*.

184. ***Stellaria nemorum*** L. Page 28.
II. Renishaw, not Eckington, *Waterfall.*

185. ***Stellaria umbrosa*** Opiz. Page 28. III. Near Sudbury!

191. ***Cerastium aquaticum*** L. (*Stellaria aquatica* Scop.). P. 29.
III. Mickleover, Bindley.

Linum angustifolium Huds. Page 29.
II. Railway sidings, Renishaw, *Waterfall.* Six plants seen.

204. ***Malva moschata*** L. P. 29. III. Near Ashbourne, *Bindley.*

205. ***Malva sylvestris*** L. Page 30.
I. Bradwell, *Fox.* III. Mickleover, *Bindley.*

206. ***Malva rotundifolia*** L. Page 30.
III. Milton, *Hagger*; Mickleover, *Bindley.*

211. ***Tilia parvifolia*** Ehrh. (*T. cordata* Mill). Page 30.
III. Mickleover, *Bindley.*

213. ***Tilia grandiflora*** Ehrh. (*T. platyphyllos* Scop.).
I. High Tor, Matlock Bath, *J. H. A. Stewart*, B. E. C. Report, p. 404. III. Mickleover, *Bindley.*

Tilia intermedia DC. (*T. vulgaris* Hayne). Page 30.
III. Mickleover, *Bindley.*

215. ***Hypericum perforatum*** L. Page 30.
I. Bradwell, *Fox.*
II. Renishaw, Scarcliffe Woods, *Waterfall.*
III. Mickleover, *Bindley*; Breadsall! Near Muggington!

216. ***Hypericum dubium*** Leers. Page 31.
I. Matlock, *Ch. Babington* in New Bot. Guide.

217. ***Hyp. quadrangulum*** L. (*H. quadratum* Stokes). Page 31.
I. Bradwell, *Fox.*
III. Mickleover, *Bindley*; near Muggington!

218. ***Hypericum humifusum*** L. Page 31.
I. Bradwell, *Fox*. III. Mickleover, *Bindley*.

220. ***Hypericum pulchrum*** L. Page 31.
I. Bradwell, *Fox*. III. Between Etwall and Barnaston, *Hagger*; Mickleover, *Bindley*.

221. ***Hypericum hirsutum*** L. Page 31.
III. Mickleover, *Bindley*.

222. ***Hypericum montanum*** L. Page 31.
I. Near Hartington, *Bindley*.

225. ***Acer campestre*** L. Page 32.
II. Stanton-by-Dale! About Renishaw; Clinker Wood, *Waterfall*.

230. ***Geranium sylvaticum*** L. Page 32.
I. Zig-zag Walk, Matlock, *Glover's History*.

231. ***Geranium pratense*** L. Page 32. III. Swarkestone!

232. ***Geranium pyrenaicum*** L. Page 33.
III. Markeaton Road, Derby, *Glover's History*.

245. ***Euonymus europæus*** L. II. Stretley, *Fox*.

246. ***Rhamnus catharticus*** L. Page 34.
I. High Tor, Matlock Bath! III. Mickleover, *Bindley*.
Between Stanton-by-Dale and Dale Abbey!

248. ***Sarothamnus scoparius*** Koch (*Cytisus scoparius* Lk.). P. 35.
I. Edale, *Fox*. II. Between Renishaw and Staveley, *Waterfall*. III. Willington!

250. ***Ulex Gallii*** Planch. Page 35. I. Bradwell, *Fox*.
III. Near Muggington! Near Breadsall Moor!

251. ***Genista tinctoria*** L. Page 35.
I. High Tor, Matlock Bath! Bradwell, *Fox*.
II. Stanton-by-Dale! Hawthorn Mill, between Eckington and Staveley, *Waterfall*. III. Mickleover, *Bindley*.

254. ***Ononis arvensis*** L. (*O. repens* L.). Page 35.
I. Wormhill! II. Cresswell, *Fox*.
III. Repton and Milton, *Hagger*.

257. ***Anthyllis Vulneraria*** L. Page 36. I. Matlock Bath!
II. Cresswell, *Fox*. III. Mickleover, *Bindley*.

New. ***Medicago denticulata*** Willd. III. Mickleover, *Bindley*.

264. ***Melilotus officinalis*** Willd. (Lam.). Page 36.
III. Mickleover, *Bindley*.

Melilotus arvensis Wallr. Alien. Page 36.
III. Repton, *Hagger*.

New. ***Melilotus indica*** All. Alien. III. Mickleover, *Bindley*.

272. ***Trifolium medium*** L. Page 37.
III. Mickleover, *Bindley*; Canal bank, Willington!

275. ***Trifolium arvense*** L. Page 37. III. Findern, *Bindley.*

284. ***Lotus major*** Scop. (*L. uliginosus* Schkuhr).
III. Findern, *Bindley.* Willington!

291. ***Ornithopus perpusillus*** L. Page 38.
III. Findern; Eggington, *Bindley.*

297. ***Vicia Cracca*** L. Page 38.
I. Brough, *Fox.* III. Turnditch!

298. ***Vicia angustifolia*** L. Page 39.
III. Turnditch! Morley!

303. ***Vicia hirsuta*** Gray. Page 39. III. Mickleover, *Bindley.*

304. ***Vicia tetrasperma*** Mœnch. (*V. gemella* Crantz). Page 39.
III. Mickleover, *Bindley.*

312. ***Orobus tuberosus*** L. (*Lathyrus montanus* Bernh.). Page 40.
I. Near Bradwell, *Fox.*
II. West Hallam, *Bindley*; Totley, near Sheffield, *Fox.*
III. Mickleover; Repton Shrubs, *Bindley.*

314. ***Prunus spinosa*** L. Page 40.
II. Near Holmesfield, *Fox.* III. Near Derby!

314. ***Prunus insititia*** Huds. Page 40.
II. Stanley, *Hassé* (not Hanley, as in 'Flora').
III. Derby!

Prunus domestica L. Page 40. II. Staveley, *Waterfall.*

316. ***Prunus Avium*** L. Page 41. III. Duffield!

318. ***Spiræa Filipendula*** L. P. 41. I. Youlgreave, *C. T. Green.*
[***Spiræa opulifolia*** W.?
Hedges, Hassop, planted, *Bailey.*]

322. ***Geum rivale*** L. Page 41.
I. Haddon and Cromford, *Bindley*; near Bradwell, *Fox.*
III. Hognaston, *Bindley.*

322B. ***Geum intermedium*** Ehrh. (*G. rivale* × *urbanum*). P. 41.
I. Chee Dale!

322. ***Potentilla procumbens*** Sibth. Page 42.
III. Bradley, *Linton*, B. E. C. Report, p. 259.

334. ***Comarum palustris*** L. (*P. palustris* Scop.). Page 42.
I. Hogshaw Lane, Buxton, *C. T. Green.*

339.**Rubus Idæus*** L. Page 43.
New. Var. ***Leesii*** Bab. III. Shirley, *Linton*, B. E. C. Report, page 284; Hulland Ward, *Linton*, l.c., p. 326.

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*I have arranged this genus according to Lond. Cat., Ed. ix. The numbers prefixed to the species are those of my book.

340. 4. ***Rubus fissus*** Lindl. Page 43.
III. Osmaston Park, *Linton* ; Gunn's Wood, Muggington!

340. 5. ***Rubus plicatus*** W.&N. Page 43.
III. Bradley, *Linton*, B. E. C. Report, p. 285.

New. ***Rubus Rogersii*** *Linton.*
III. Shirley, *Linton*. This plant was formerly considered to be *R. opacus* Focke (B. E. C. Report, p. 285), but is now placed here by Rev. W. Moyle Rogers.

New. ***Rubus nitidus*** W.&N.
III. The Holt, Edlaston, and Brailsford, *Linton*, B. E. C. Report, p. 285.

340. 6. ***Rubus affinis*** W.&N. Page 43.
I. New Mills, east of R. Goyt, *Rev. W. Moyle Rogers.*

340. 18. ***Rubus carpinifolius*** W.&N. Page 45.
III. Shirley Brook ; Bradley Wood, *Linton.*

340. 9. ***Rubus incurvatus*** Bab. Page 44.
III. Yeldersley, *Linton*, B. E. C. Report, p. 288.

340. 7. ***Rubus Lindleianus*** Lees. Page 44.
I. Matlock Bath! III. Willington!

New. ***Rubus durescens*** W. R. Linton.
II. Pondarns Wood ; Belper, *E. F. Linton.*
III. Near Cross o' th' Hands, *E. F. Linton* ; near Shirley ; near Brailsford ; near Bradley (as *R. septorum* Müll, 9th September 1887, 21st August 1888), *W. R. Linton.* For these plants the Rev. W. Moyle Rogers has referred me to J. of Bot., 1892, pp. 70-71.

340. 8. ***Rubus rhamnifolius*** W.&N. Page 44.
No additional habitats.

340. 20. ***Rubus pulcherrimus*** Neum. Page 45.
This is the plant which was formerly placed under *R. nemoralis* Müll., *R. Mausii* Focke, *R. macrophyllus* var. *umbrosus* Bab.
III. Hulland Moss ; Brailsford, *Linton*, B. E. C. Report, p. 290.

New. ***Rubus damnoniensis*** Bab.
III. Near Long Lane, *Linton*, B. E. C. Report, p. 288.

Rubus villicaulis Koehl.

New. Var. ***Selmeri*** Lindb.
I. Bugworth and New Mills, *Rev. W. Moyle Rogers*, B. E. C. Report, p. 406.
II. Ashopton, *Linton.*

VAR. ***calvatus*** Blox. (*R. Salteri* Bab. var. *calvatus* Blox., p. 45.)

III. Shirley, *Purchas*, B. E. C. Report, p. 251; Ednaston and Brailsford, *Linton*, p. 289; Repton, *Hagger*.

340. 19. ***Rubus gratus*** Focke.

III. Shirley, *Linton*. Passed by Dr. Focke.

Rubus ramosus Bloxam. P. 44. No additional habitat.

New. ***Rubus argentatus*** P. J. Muell.

VAR. ***robustus*** (P. J. Muell.).

III. Yeaveley, Stydd, *Linton*.

This plant was issued through 'the Exchange Club for the British Isles,' by Rev. W. R. Linton as *R. macroacanthus* Blox., but has been named as above by Mr. Rogers. Perhaps the plant named *macroacanthus* Blox., and found by him at White Lees and Broadstone, Tickenhall, should come here.

340. 12. ***Rubus rusticanus*** Merc. Page 44.

III. Muggington! Stanton-by-Bridge!

340. 13. ***Rubus pubescens*** Weihe. Page 44.

No additional habitats.

Rubus thyrsoideus Wimm. Page 44.

III. Stanton-by-Bridge! Repton!

A specimen of this bramble was sent me by Mr. Hagger from Repton, and named as such by Mr. Purchas. Since then I have submitted specimens, obtained at Stanton-by-Bridge and Repton by myself, to Dr. Focke, who said respecting them, 'Indeed *thyrsoideus*.' Whether I gathered my specimens at Mr. Purchas's and Mr. Hagger's habitats I cannot say.

340. 20. ***Rubus macrophyllus*** W.&N. Page 45.

VAR. ***amplificatus*** (Lees).

II. Pincham's Hill, Belper, *Linton*.

III. Shirley, *Linton*, B. E. C. Report, p. 364.

340. 22. ***Rubus Sprengelii*** Weihe. Page 46.

III. Gunn's Hill, Muggington!

340. 14. ***Rubus leucostachys*** Schleich.

I. High Tor, Matlock Bath!

III. Osmaston-by-Ashbourne; near Shirley, *Linton*, B. E. C. Report, p. 328.

Rubus anglosaxonicus Gelert. Page 46.

VAR. ***raduloides*** Rogers (*R. radula* Weihe, p. 40).

III. A curious form, Aldercar, near Bradley; Osmaston-by-Ashbourne, *Linton,* B. E. C. Report, p. 328.

Rubus Leyanus Rogers (*R. Drejeri* Jens.). Page 46.

III. Brailsford, fide Dr. Focke, *Linton.*

Rubus radula Weihe. VAR. ***echinatoides*** Rogers.

III. Shirley, *Linton*; *Rev. W. Moyle Rogers.*

New. ***Rubus podophyllus*** P. J. Muell.

I. Chinworth, *Linton*; near Mottram, *Bailey*, J. B., 1894, p. 24.

Rubus echinatus Lindl. Page 46. No additional habitat.

340. 28. ***Rubus rudis*** W.&N.

I. Near New Bath Hotel, Matlock Bath!

Rubus melanodermis Focke (*R. melanoxylon* P. J. Muell.). Page 47.

III. Brailsford, *Linton*; Shirley, *Purchas*, B. E. C. Report, p. 251; Ednaston, *Linton*, l.c., p. 289.

Rubus scaber W.&N.

II. Near Belper, *E. F. Linton*, B. E. C. Report, p. 366.

III. Cross o' th' Hands, *E. F. Linton*, B. E. C. Report, p. 440.

Rubus fuscus W.&N. Fide Dr. Focke. (*R. heteroclitus* Blox., fide Prof. Babington.)

III. Hulland, *Linton*, B. E. C. Report, pp. 331, 409.

Rubus foliosus W.&N.

I. Charlesworth, *Linton*, B. E. C. Report, p. 409.

Rubus rosaceus W.&N.

VAR. ***hystrix*** (W.&N.). No additional habitat.

New. VAR. ***infecundus*** Rogers.

III. Shirley, *Linton*, B. E. C. Report, p. 366.

340. 30. ***Rubus Koehleri*** W.&N.

VAR. ***pallidus*** Bab. III. Breadsall Moor!

Rubus fusco-ater Weihe.

III. Shirley, *Linton*, B. E. C. Report, p. 367.

New. ***Rubus saxicolus*** P. J. Muell.

III. Willington and Repton! *Dr. Focke.*

New. ***Rubus dumetorum*** W.&N.

VAR. ***ferox*** Weihe.

III. Shirley, *Linton*, B. E. C. Report, p. 368.

VAR. ***diversiflorus*** (Lindl.).

III. Muggington, *Linton*; Mackworth, *Bindley*. *R. dumetorum* W.&N. var. *intensus* Blox. should be placed here. Page 47.

VAR. ***rubiflorus*** Purchas.

III. Osmaston-by-Ashbourne; Shirley; Yeaveley; Edlaston; Brailsford; Hulland, etc., *Purchas*, J. B., 1894; Bradley, *Linton*.

340. 12. VAR. ***tuberculatus*** Bab. (*R. scabrosus* P. J. Muell). P. 48.

III. Breadsall Moor!

VAR. ***concinnus*** Warren.

I. Near Whaley Bridge Station, *Bailey*, B. E. C. Report, p. 258.

340. 40. ***Rubus corylifolius*** Sm.

VAR. ***sublustris*** Lees. Page 48.

III. Muggington! Chellaston!

VAR. ***cyclophyllus*** Lindeb. (var. *conjungens* Bab.). Page 48. No additional habitats.

Rubus althæifolius Bab.

Is thought by Rev. W. Moyle Rogers to be of too indeterminate a character to claim a place in our list of *Rubi* at present, while the name *R. deltoideus* Müll., Dr. Focke has assured Mr. Rogers, belongs to a hybrid, *R. cæsius* × *tomentosus*, which we cannot expect to find in Britain, where *R. tomentosus* is unknown.

340. 43. ***Rubus cæsius*** L. Page 48.

I. Bradwell, *Fox*. III. Mackworth, *Bindley*.

VAR. ***aquaticus*** W.&N. (*umbrosus* Reich. Page 48). No additional habitat.

338. ***Rubus saxatilis*** L. Page 43.

337. ***Rubus Chamæmorus*** L. Page 43.

No additional information has been received respecting these two *Rubi*.

Rubus Idæus* × *cæsius (*R. cæsius* var. *Pseudo-Idæus*).

No additional habitat.

***Rubus Lindleyanus* × *radula*.**

III. Shirley, *Linton*, B. E. C. Report, p. 368.

***Rubus calvatus* × *pubescens*.**

III. Shirley, *Linton*, B. E. C. Report, p. 328.

***Rubus leucostachys* × *rusticanus*.**

I. Matlock Bath, *Linton*, B. E. C. Report, p. 412.

***Rubus leucostachys* × *Sprengelii*.**

III. Shirley, *Linton*, B. E. C. Report, 412.

***Rubus anglosaxonicus* × *rudis*.**

I. Matlock Bath! fide Rev. W. Moyle Rogers.

343.***Rosa involuta** Sm. Page 49. III. Mickleover, *Bindley.*

344. ***Rosa mollis*** Sm. Page 49. III. Mickleover, *Bindley.*

VAR. ***cærulea*** Woods.

III. A form with white flowers, dense aciculation of stem and fruit. Brailsford, *Linton,* B. E. C. Report, p. 259.

345. ***Rosa tomentosa*** Smith. Page 49.

III. Brailsford; near Manshull Park; near Shirley, *Linton,* B. E. C. Report, p. 334.

New. ***Rosa sepium*** Thuill. III. Near Repton!

Rosa obtusifolia Desv.

VAR. ***tomentella*** (Leman). Page 51.

III. Longford, *Linton,* B. E. C. Report, p. 298.

f. ***decipiens*** (Dum.). Shirley, *Linton,* B. E. C. Report, p. 414.

351. ***Rosa canina*** L. Page 50.

VAR. ***lutetiana*** (Leman). Page 50.

f. ***andevagensis*** (Bast.). Page 51.

III. With glandular sepals, Atlow, *Linton,* B. E. C. Report, p. 297.

VAR. ***senticosa*** (Ach.).

III. Atlow, *Linton,* B. E. C. Report, p. 260.

VAR. ***dumalis*** (Bechst.). Page 50.

III. Bradley, *Linton.* B. E. C. Report, p. 260.

Rosa glauca Vill. Page 51.

I. Whaley Bridge, *Bailey,* B. E. C. Report, p. 260.

III. Hulland, *Linton,* B. E. C. Report, p. 260.

VAR. ***corilifolia*** (Fr.). Page 51.

III. Bradley; Atlow, *Linton,* B. E. C. Report, pp. 261 and 298.

353. ***Rosa arvensis*** L. Page 52.

III. Atlow; Hollington, *Linton,* B. E. C. Report, p. 261.

VAR. ***gallicoides*** Baker.

III. Ashbourne; Bradley; Hollington, *Linton,* B. E. C. Report, p. 261.

354. ***Agrimonia Eupatoria*** L. Page 52.

II. The Hague, Renishaw, *Waterfall.* III. Chellaston!

354.***Sanguisorba officinalis** L. [*Poterium officinale* Hook.fil.] Page 52.

I. Bradwell, *Fox.*

II. College Meadow, The Hague, Chesterfield, *Waterfall.*

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* This genus I have arranged according to the London Catalogue.

355. ***Poterium Sanguisorba*** L. Page 52.
I. Miller's Dale, *Hannan*; Matlock Bath, *Bindley*.
II. Markland Grips, Clowne, *Waterfall*. [College Meadow, etc., *Waterfall*, is an error.]
New. ***Poterium polygamum*** Waldst & Kit. Casual.
III. Mickleover, *Bindley*.

356. ***Alchemilla arvensis*** Scop. Page 53.
I. Haddon, *Bindley*. III. Repton Rocks, *Hagger*; Mickleover and Findern, *Bindley*.

363. ***Pyrus Malus*** L. Page 53.
Var. ***mitis*** Wallr. III. Breadsall Moor!
Var. ***acerba*** DC. III. Ireton; Qruandon!

365. ***Pyrus Aria*** Sm. Page 54.
I. Blackwell Dale! High Tor, Matlock Bath!

367. ***Epilobium angustifolium*** L. Page 54.
III. Mickleover; Radbourne, *Bindley*; Muggington!

368. ***Epilobium hirsutum*** L. Page 54.
I. Bradwell, *Fox*. III. Willington; Hazlewood!

369. ***Epilobium parviflorum*** Schreb. Page 54.
I. Bradwell, *Fox*. III. Mickleover, *Bindley*.
× ***obscurum.*** III. Brailsford Brook and Bradley, *Linton*, B. E. C. Report, p. 262.
Epilobium montanum* × *obscurum. Page 55.
Bradley Wood and Edlaston, *Linton*, B. E. C. Report, p. 262.

371. ***Epilobium roseum*** Schreb. P. 55. III. Winshill, *Harris*.

373.* ***Epilobium obscurum*** Schreb. Page 55.
I. Miller's Dale, *Searle*. III. Muggington!

377. ***Circæa lutetiana*** L. Page 56.
I. Brough, *Fox*. III. Repton, *Hagger*; Mickleover; Radbourne, *Bindley*; Muggington!

381. ***Myriophyllum spicatum*** L. Page 56.
II. Renishaw Canal, *Waterfall*.

384. ***Callitriche platycarpa*** Kutz. (*C. stagnalis* Scop.). Page 57
III. Breadsall!

390. ***Lythrum Salicaria*** L. Page 57. III. Repton, *Bindley*.

393. ***Bryonia dioica*** Jacq. Page 58.
III. Swarkestone! Findern, *Bindley*.

404. ***Ribes rubrum*** L. Page 58.
III. Mickleover; Radbourne, *Bindley*.

406. ***Ribes Grossularia*** L. Page 59.
I. Stoney Middleton, *Fox*. III. Radbourne, *Bindley*.

427. ***Saxifraga granulata*** L. Page 60.
I. Charlesworth, *Whitehead*; near Strines, *Sunderland*; Corbar Wood, *Mrs. Loosmore*; near Bakewell, *Friend*; Hopton; Edensor, *Bindley*; Bradwell and Hathersage, *Fox*.
III. Mickleover; Repton, *Bindley*.

430. ***Saxifraga tridactylites*** L. Page 60.
III. Repton, *Hagger*.

431. ***Saxifraga hypnoides*** L. Page 60.
I. Near Bakewell, *Friend*; Miller's Dale! Bradwell, *Fox*.

434. ***Chrysosplenium oppositifolium*** L. Page 61.
I. Lee Hill, Cromford! Bradwell, *Fox*.
III. Ashbourne; Kirk Langley, *Bindley*.

435. ***Chrysosplenium alternifolium*** L. Page 61.
I. Stirrup Wood, Charlesworth, *Whitelegge*.

436. ***Parnassia palustris*** L. Page 61.
I. Cressbrook, *Fox*. II. Shireoaks, *Friend*.

437. ***Adoxa Moschatellina*** L. Page 61.
I. Hathersage, *Fox*; Dovedale, *Bindley*.
II. Totley, *Fox*. III. Dalbury, *Bindley*.

439. ***Cornus sanguinea*** L. Page 61.
I. High Tor, Matlock Bath! II. Cresswell, *Fox*.

441. ***Hydrocotyle vulgaris*** L. Page 62.
I. Near Bradwell, *Fox*. III. Repton Rocks!

442. ***Sanicula europæa*** L. Page 62.
II. Totley, *Fox*. III. Mickleover; Mackworth, *Bindley*.

446. ***Conium maculatum*** L. Page 62.
II. Banks of R. Rother, Renishaw, *Waterfall*.
III. Mickleover, *Bindley*.

454. ***Helosciadum nodiflorum*** Koch. (*Apium nodiflorum* Reich. *fil.*) Page 62. I. Miller's Dale! Bradwell, *Fox*.

462. ***Pimpinella saxifraga*** L. Page 63.
II. Norton, near Sheffield, *Fox*.

463. ***Pimpinella major*** Huds. Page 63.
III. Mickleover; Radbourne, *Bindley*.

465. ***Sium angustifolium*** L. (*S. erectum* Huds.). Page 64.
III. Findern, *Bindley*.

470. ***Œnanthe fistulosa*** L. Page 64. III. Twyford, *Bindley*.

479. ***Silaus pratensis*** Bess. (*S. flavescens* Bernh.). Page 64.
III. Mickleover, *Bindley*.

482. ***Angelica sylvestris*** L. Page 64. III. Willington, *Bindley*.

Pastinaca sativa L. (*Peucedanum sativum* Benth. & Hook. fil.). Page 65.
III. Railway Bank, Mickleover, *Bindley.*

489. ***Daucus Carota*** L. Page 65. III. Mickleover, *Bindley.*

495. ***Torilis nodosa*** Gærtn. (*Caucalis nodosa* Scop.). Page 65.
I. Dovedale, *Nat. Hist. Tutbury.*
III. Breadsall, *Whittaker.*

496. ***Scandix Pecten-Veneris*** L. Page 65.
II. Norton, near Sheffield, *Fox.*
III. Cornfields, Mickleover, *Bindley.*

501. ***Myrrhis odorata*** Scop. Page 66. I. Blackwell Dale!

506. ***Viburnum Opulus*** L. Page 66.
II. Clinker Wood, Renishaw, *Waterfall.*
III. Mickleover, *Bindley.*

515. ***Galium palustre*** L. VAR. ***Witheringii*** (Sm.).
I. Axe Edge!
III. Morley! Canal at Chaddesden! Willington! Repton!

519. ***Galium Mollugo*** L. Page 68.
III. Railway Bank, Mickleover, *Bindley.*

520. ***Galium sylvestre*** Poll. Page 68.
I. High Tor, Matlock Bath!

526. ***Sherardia arvensis*** L. Page 68.
II. Norton, near Sheffield, *Fox.* III. Mickleover, *Bindley.*

527. ***Asperula odorata*** L. Page 68.
I. Hathersage, *Fox.* Via Gellia, *Bindley.*

531. ***Valeriana dioica*** L. Page 69.
I. Near Bakewell, *Friend.*
II. Scarcliffe Woods, *Waterfall.*

532. ***Valeriana officinalis*** L. Page 69.
VAR. ***sambucifolia*** Auct. Ang. (Willd.).
I. Bradwell, *Fox.* III. Mickleover, *Bindley*; Repton!

Valerianella carinata Lois. Page 69.
Not a Casual, as stated in my Flora.
I. Deepdale, etc., Buxton, *Rev. A. Ley*, Journal of Botany, 1884; near Lover's Leap, Ashwood Dale!

539. ***Dipsacus sylvestris*** Huds. Page 69.
III. Mickleover; Radbourne, *Bindley.*

540. ***Dipsacus pilosus*** L. Page 70.
III. R. Dove, Uttoxeter, *Friend.*

541. ***Scabiosa succisa*** L. Page 70.
I. Bradwell, *Hope.* II. Norton, near Sheffield, *Fox.*
III. Mickleover, *Bindley.*

542. ***Scabiosa Columbaria*** L. P. 70. I. Hartington, *Bindley.*

544. ***Tragopogon pratense*** L. Page 70.

VAR. ***minus*** (Mill.).

I. Blackwell Dale! II. Norton, near Sheffield, *Fox.*

III. Mickleover; Findern, *Bindley*; Chaddesden!

547. ***Picris hieracioides*** L. Page 71.

I. Matlock Bath!

III. Mansfield Road, Breadsall! Chellaston!

548. ***Leontodon hirtus*** L. Page 71.

III. Between Swarkestone and Chellaston!

553. ***Hypochœris radicata*** L. Page 71.

II. Grindleford; Norton, near Sheffield, *Fox.*

III. Mickleover, *Bindley.*

554. ***Lactuca virosa*** L. Page 71. III. Radbourne, *Bindley.*

Lactuca Scariola.

I. Peak's Hole, *Martyn*, Phil. Trans. of Royal Society.

557. ***Lactuca muralis*** Fresen. Page 71.

III. Anchor Church; Radbourne, *Bindley.*

559. ***Sonchus arvensis*** L. Page 72.

I. Bradwell. II. Totley, *Fox.*

III. Mickleover, *Bindley*; Breadsall Moor! nr. Muggington!

560. ***Sonchus asper*** Hoff. Page 72.

III. Mickleover, *Bindley.*

561. ***Sonchus oleraceus*** L. Page 72.

I. Bradley. II. Holmesfield, *Fox.*

III. Mickleover, *Bindley.*

New. ***Crepis taraxacifolia*** Thuill. III. Yeldersley, *Linton.*

Crepis nicæensis Balb. Page 72.

III. Yeldersley, *Linton*, B. E. C. Report, 1889, p. 262.

New. ***Crepis biennis*** L.

III. Burnaston, *Bindley.*

†New. ***Hieracium britannicum*** F.J.H. I. Chee Dale! Ashwood Dale, Buxton; Monks Ghyll, Millerdale, *Waterfall.*

572. ***Hieracium murorum*** L. pt. Page 73.

I. High Tor, Matlock Bath!

VAR. ***ciliatum*** Almq.

I. Rock between Buxton and Miller's Dale, *Linton*, J. of B., 1893, p. 179.

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† I have arranged this genus according to the last edition of the London Catalogue, the 9th.

New. ***Hieracium rubiginosum*** F. J. Hanb.
I. Blackwell Dale!

575. ***Hieracium pallidum*** Fries. Page 73.
I. Blackwell Dale!

575*. ***Hieracium argenteum*** Fries. is ***H. vulgatum*** Fries, fide *Rev. W. R. Linton.* Before submitting this plant to Mr. Hanbury I called it *H. vulgatum.*

New. ***Hieracium holophyllum*** *W. R. Linton.*
I. Dovedale, *Linton*, B. E. C. Report, p. 304.

New. ***Hieracium Orarium*** Lindb.
I. Dovedale, *E. F. Linton,* J. of B., 1891, p. 273.

573*. ***Hieracium vulgatum*** Fr. Page 73.
III. Dalbury; Mickleover, *Bindley.*

New. ***Hieracium diaphanoides*** Lindeb.
I. Chee Tor, near Woanhill, *Rev. A. Ley*, B. E. C. Report, p. 264; Ballidon, *Linton*, B. E. C. Report, p. 305.

New. ***Hieracium sciaphilum*** *Uechtritz.*
I. Charlesworth, *Linton*, B. E. C. Report, p. 456; wood near the Aqueduct, Buxton, *Waterfall*; Dovedale, *Purchas,* J. of B., 1893, p. 197.
III. Brailsford; Shirley; Yeldersley; Ballidon; Atlow, *Linton*, B. E. C. Report, p. 304.

584. ***Hieracium boreale*** Fr. Page 74.
III. Mickleover, *Bindley.* Muggington!

581. ***Hieracium umbellatum*** L. Page 74.
III. Mickleover, *Bindley*; Atlow, *Linton*, B. E. C. Report, p. 306.

Arctium majus Bernh. Topographical Botany, *Kirk MS.*

[***Arctium lappa.*** Pilkington's History; no habitat given.]

Arctium intermedium Lange. Page 75.
(Not included in *A. nemorosum* Lange, as in my book, Topographical Botany.)

594. ***Serratula tinctoria*** L. Page 75.
II. Park Hall Woods, Spinkhill, Chesterfield, *Waterfall*; Norton, near Sheffield, *Fox.*
III. Mickleover; Barnaston, *Bindley.*

New. ***Cnicus pratensis*** Willd.
III. Findern and Radbourne, *Bindley.*

Carduus Marianus L. (*Mariana lactea* Hill). Page 76.
III. Mickleover, on cultivated ground, *Bindley.*

613. ***Centaurea Scabiosa*** L. Page 76. II. Cresswell, *Fox*.

619. ***Eupatorium cannabinum*** L. Page 77.
I. Haddon, *Bindley*. II. Steetley, near Shireoaks, *Fox*.
III. Muggington!

626. ***Artemisia vulgaris*** L. P. 77. III. Mickleover, *Bindley*.

630. ***Gnaphalium sylvaticum*** L. Page 77.
III. Mickleover, *Bindley*; Muggington!

632. ***Gnaphalium uliginosum*** L. Page 77.
III. Mickleover and Long Lane, *Bindley*!

635. ***Filago germanica*** L. Page 78. I. Tideswell, *Bindley*.

642. ***Solidago Virgaurea*** L. Page 78. II. Holmesfield, *Fox*.

644. ***Senecio sylvaticus*** L. Page 78.
III. Mickleover and Findern, *Bindley*.

647. ***Senecio erucifolius*** L. Page 79.
II. Haythorne Hill, between Eckington and Staveley, *Waterfall*. III. Mickleover, *Bindley*.

Doronicum Pardalianches L. Page 79.
I. Haddon Hall, *C. T. Green*; *Bindley*.

656. ***Inula Conyza*** DC. Page 79. II. Steetley, *Fox*.

658. ***Pulicaria dysenterica*** Gærtn. Page 79.
II. Holmesfield, *Fox*. III. Mickleover, *Bindley*.

661. ***Chrysanthemum segetum*** L. Page 79.
III. Mickleover; Swarkestone, *Bindley*.

663.****Tanacetum vulgare*** L. Page 80.
II. Banks of R. Rother, Renishaw, *Waterfall*.

664. ***Pyrethrum inodorum*** Sm. (*Matricaria inodora* L.). P. 80.
III. Mickleover, *Bindley*; Swarkestone!

665. ***Matricaria Chamomilla*** L. Page 80.
III. Mickleover, *Bindley*.

669. ***Anthemis Cotula*** L. Page 80. III. Mickleover, *Bindley*.

670. ***Achillea Ptarmica*** L. Page 80. I. Near Brough, *Fox*.
II. Norton, *Fox*. III. Mickleover, *Bindley*.

678. ***Campanula latifolia*** L. Page 81. I. Matlock Bath!
II. Woods and Hedges, Renishaw, *Waterfall*.
III. Ashbourne, *Bindley*; near Cubley, *Friend*; near Muggington! Chaddesden, probably a garden escape!

680. ***Campanula Trachelium*** L. Page 81.
I. Cressbrook, *Fox*. II. Pleasley Vale, *Friend*.

687. ***Jasione montana*** L. Page 82. III. Findern, *Bindley*!

691. ***Erica cinerea*** L. Page 82.
I. Bradwell; Ringinglowe (borders of Yorkshire), *Fox.*

699. ***Andromeda Polifolia*** L. Page 83.
II. Coombes Moss, *Waterfall.*

705. ***Vaccinium Vitis-idæa*** L. Page 83.
I. Wirksworth, *Bindley*; Ringinglowe, *Fox.*

713. ***Ilex Aquifolium*** L. Page 84.
III. In flower 1st May 1893 at Ireton!

714. ***Ligustrum vulgare*** L. Page 84. II. Steetley, *Fox.*

716. ***Vinca minor*** L. Page 84. III. Radbourne, *Bindley.*

719. ***Gentiana Pneumonanthe*** L. Page 84.
III. Eggington Heath, *Pilkington's History.*

721. ***Gentiana Amarella*** L. I. Crich!

724. ***Erythræa Centaurium*** Pers. Page 85.
I. Near Dore, *Fox.* III. Mickleover, *Bindley.*

725. ***Chlora (Blackstonia) perfoliata*** L. (Huds.). Page 85.
II. Near Clowne, *Waterfall.*

728. ***Polemonium cæruleum*** L. Page 85.
I. Winnatts! Hogshaw Lane, Buxton, *C. T. Green.*

737. ***Solanum nigrum*** L. Page 86.
III. Mickleover, *Bindley.*

739. ***Atropa Belladonna*** L. Page 86.
I. Haddon Hall, *C. T. Green.*

740. ***Verbascum Thapsus*** L. Page 86.
II. Cresswell and Steetley, *Fox.*

New. ***Verbascum virgatum*** *Stokes.*
III. Near Chellaston, *Rev. A. C. Hassé.*

754. ***Veronica Anagallis*** L. Page 87.
II. Cresswell, *Fox.*

756. ***Veronica officinalis*** L. Page 87.
I. Matlock, *Bindley.*
III. Mickleover; Radbourne; Knowl Hills, *Bindley.*

757. ***Veronica montana*** L. Page 87.
I. Haddon, *Bindley*; Chee Dale!
III. Kirk Langley, *Bindley.*

759. ***Veronica hederæfolia*** L. Page 88.
III. Repton, *Hagger*; Mickleover, *Bindley.*

761. ***Veronica polita*** Fr. Page 88.
II. Between Cresswell and Clowne by roadside, *Waterfall.*
III. Mickleover, *Bindley.*

Veronica Buxbaumii Pen. (*Veronica Tournefortii* Gmel.). Page 88.

III. Ockbrook! Mickleover, *Bindley.*

765. ***Bartsia Odontites*** *Huds.* Page 88.

I. Bradwell; Hope, *Fox.* II. Holmesfield, *Fox.*

III. Ockbrook! Mickleover, *Bindley.*

773. ***Pedicularis sylvatica*** L. Page 89.

I. Bradwell, *Fox.* II. Norton, *Fox.*

III. Mickleover, *Bindley.*

770. ***Melampyrum pratense*** L. Page 88.

III. Morley!

VAR. ***latifolium*** *Bab.*

I. Raven's Dale, *Searle.*

775. ***Scrophularia Balbisii*** *Horn* (*S. aquatica* L.). Page 89.

I. Matlock Bath!

III. Repton, *Hagger*; between Chellaston and Swarkestone!

782. ***Linaria Cymbalaria*** Mill. Page 89.

I. Near Hathersage, *Fox.* III. Stanton-by-Bridge!

783. ***Linaria Elatine*** *Mill.* Page 89.

III. Boozwood, near Holbrook, *Pilkington.*

785. ***Linaria vulgaris*** Mill. Page 89.

I. Bradwell Dale, *Fox.* II. Banks of R. Rother, near Renishaw, *Waterfall.* III. Breadsall!

787. ***Linaria minor*** Desf. (*L. viscida* Mœnch). Page 90.

II. Railway between Chesterfield and Clowne, *Waterfall.*

Mimulus luteus L. Page 90.

I. Hathersage and Bradwell, *Fox.* II. Cresswell, *Fox.*

801. ***Lycopus europæus*** L. Page 91.

II. Canal Bank, Renishaw, *Waterfall.*

III. Burnaston; Findern, *Bindley.*

805. ***Mentha Piperita*** Huds. Page 91.

II. Belper and Snelstone, *Linton*, B. E. C. Report, p. 382.

806. ***Mentha hirsuta*** L. Page 91.

III. Mickleover, *Bindley*; Willington!

807. ***Mentha sativa*** L. Page 92.

VAR. ***paludosa*** (Sole).

III. Atlow, *Linton*, B. E. C. Report, p. 307.

VAR. ***rubra*** Sm. (*M. rubra* Sm.).

III. Shirley, *Linton*, B. E. C. Report, p. 307.

808. ***Mentha arvensis*** L. Page 92.

III. Yeldersley, *Linton*, B. E. C. Report, p. 308.

VAR. ***Nummularia*** (Schreb.).
III. Yeldersley, *Linton*, B. E. C. Report, p. 308.

Mentha arvensis* × *sativa.
III. Shirley, *Linton*, B. E. C. Report, p. 267.

809. ***Mentha Pulegium*** L. Page 92.
III. Ockbrook; Radbourne and Langley Commons, *Pilkington's History.*

810. ***Thymus Serpyllum*** Fr. Page 92.
I. Turnditch! Bradwell Common, *Fox.*

811. ***Origanum vulgare*** L. Page 92.
I. Bradwell, *Fox.*

812. ***Calamintha Acinos*** Clairv. (*C. arvensis* Lam.). Page 92.
I. Miller's Dale!

814. ***Calamintha officinalis*** Mœnch. Page 93.
II. Cresswell Crags, *Friend.*

815. ***Calamintha Clinopodium*** Spenn. Page 93.
I. Bradwell, *Fox.* III. Mickleover, *Bindley.*

822. ***Ajuga reptans*** L. Page 93.
I. Hathersage, *Fox.* II. Omit, *Waterfall.*
III. Mickleover; Radbourne, *Bindley.*

825. ***Ballota nigra*** L. Page 93.
III. Mickleover; Burnaston, *Bindley*; Swarkestone!

827. ***Lamium Galeobdolon*** Crantz. Page 93.
I. Via Gellia, *Bindley*; Grindleford, *Fox.*
II. Clinker Wood, *Waterfall*; Totley, *Fox.*
III. Anchor Church; Dale Abbey; Kirk Langley, *Bindley.*

832. ***Galeopsis Ladanum*** L. Page 94. II. Totley, *Fox.*

834. ***Galeopsis Tetrahit*** L. Page 94. I. Bradwell, *Fox.*

835. ***Galeopsis versicolor*** Curt. Page 94. I. Bradwell, *Fox.*
II. Near Renishaw, *Waterfall.* III. Eggington, *Bindley.*

Galeopsis intermedium Vill. (Not in Lond. Cat.).
II. Bolsover, *Linton*, Journ. of Botany, 1895, pp. 155-186.

836. ***Stachys Betonica*** Benth. Page 94.
I. Bradwell, *Fox.* III. Mickleover, *Bindley.*

837. ***Stachys palustris*** L. Page 95.
I. Near Brough, *Fox.*
III. Findern; Mackworth, *Bindley.*

ambigua Sm. (× *sylvatica*).
III. Muggington!

840. ***Stachys arvensis*** L. Page 95.
III. Eggington, *Bindley.*

Nepeta Cataria L. Page 95.

III. Tickenhall Lime Quarries, *Rev. W. H. Purchas*, J. of B., 1887, p. 141. Accidentally omitted in 'Flora of Derbyshire.'

845. ***Scutellaria galericulata*** L. Page 96.

II. Canal bank, Renishaw, *Waterfall.*

III. Canal, Findern, *Bindley*; Canal, Willington! near Muggington!

847. ***Myosotis palustris*** Relh. Page 96.

I. Via Gellia! Hathersage and Bradwell, *Fox.*

III. Findern, *Bindley.*

Var. ***strigulosa*** *Mert. & Koch.*

III. Canal Side, Willington! Breadsall!

848. ***Myosotis repens*** G. Don. Page 96.

III. Between Chellaston and Swarkestone! Repton!

849. ***Myosotis cæspitosa*** F. Schultz. Page 96.

III. Near Breadsall Priory!

851. ***Myosotis sylvatica*** Hoffm. Page 97.

I. Ashford Dale! Blackwell Dale! near Cromford!

III. Mickleover and Radbourne, *Bindley*; near Muggington!

853. ***Myosotis collina*** Hoffm. Page 97.

I. Blackwell Dale! III. Birdsgrove, *Smith MSS.*

854. ***Myosotis versicolor*** Reichb. Page 97.

III. Mickleover, *Bindley.*

855. ***Lithospermum officinale*** L. Page 97.

II. Steetley, *Fox.*

859. ***Symphytum officinale*** L. Page 97.

I. Bradwell, *Fox.*

866. ***Cynoglossum officinale*** L. Page 98.

II. Cresswell, *Fox.*

869. ***Echium vulgare*** L. Page 98.

II. Cresswell, *Fox.*

872. ***Pinguicula vulgaris*** L. Page 99.

I. Foot of Axe Edge, *C. T. Green*; Ashwood Dale! near Bradwell, *Fox.*

886. ***Lysimachia vulgaris*** L. Page 99.

I. The entry for Dovedale in Flora is an error on my part.

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888. ***Lysimachia Nummularia*** L. Page 99.
II. The Hague habitat has been destroyed; near the Ball Inn, Renishaw, *Waterfall.*
III. Findern; Knowl Hills, *Bindley.*

889. ***Lysimachia nemorum*** L. Page 99.
I. Bradwell, *Fox*; Whatstandwell, *Bindley.*
II. Park Hall Woods, near Spinkhill, *Waterfall.*

890. ***Anagallis arvensis*** L. Page 100. II. Totley, *Fox.*
VAR. ***cærulea*** Schreb. (*A. cærulea* Schreb.).
III. Mickleover, *Bindley.*

891. ***Anagallis tenella*** L. Page 100. I. Near Bradwell, *Fox.*

893. ***Samolus Valerandi*** L. Page 100.
II. Shireoaks, *Friend.*

901. ***Plantago major*** L. Page 100.
New. VAR. ***intermedia*** (Gilib.).
III. Shirley, *Linton*; Muggington!

902. ***Plantago media*** L. Page 100.
I. Matlock Bath! III. Chellaston!

909. ***Chenopodium polyspermum*** L. Page 101.
III. Mickleover, *Bindley.*

911. ***Chenopodium rubrum*** L. Page 101.
III. Mickleover, *Bindley.*

917. ***Chenopodium Bonus-Henricus*** L. Page 101.
II. Holmesfield, *Fox.*

922. ***Atriplex hastata*** L. Page 102.
II. Totley; Norton, *Fox.*

923B. ***Atriplex erecta*** Huds. [*A. patula* L. var. *erecta* Huds.]
Page 102. III. Mickleover, *Bindley.*

933. ***Polygonum amphibium*** L. Page 102.
I. Bradwell, *Fox.* III. Repton Park Pond, *Hagger.*

934. ***Polygonum lapathifolium*** L. Page 102.
III. Mickleover, *Bindley.*

934. ***Polygonum aviculare*** L. Page 103.
New. VAR. ***vulgatum*** Syme.
II. The Hague, Renishaw, near Chesterfield, *Waterfall.*

941. ***Polygonum Convolvulus*** L. Page 103.
II. Totley and Norton, *Fox.*

943. ***Rumex Hydrolapathum*** Huds. Page 103.
III. Findern, *Bindley.*

947. ***Rumex obtusifolius*** L. Page 103.
I. Buxton! III. About Derby!

948. ***Rumex nemorosus*** Schrad. (*R. sanguineus* L.). Page 103.
VAR. ***viridis*** (Sibth.). III. Muggington!

Rumex crispus* × *obtusifolius.
III. Edlaston, near Shirley, *Linton.*

960. ***Empetrum nigrum*** L. Page 104.
I. Coomb's Moss, Buxton, *Waterfall.*

962. ***Euphorbia Helioscopia*** L. and

971. ***Euphorbia exigua*** L. Page 105.
III. Mickleover, *Bindley.*

974. ***Euphorbia amygdaloides*** L. Page 105.
II. Omit, *Waterfall.*

978. ***Urtica urens*** L. Page 105.
III. Mickleover, *Bindley*; Willington!

982. ***Parietaria diffusa*** Koch (*P. officinalis* L.). Page 106.
II. Cresswell, *Fox.*

983. ***Humulus Lupulus*** L. Page 106.
II. Hedge near Renishaw, *Waterfall.* III. Muggington!

988. ***Quercus Robur*** L. Page 106.
VAR. ***intermedia*** (D. Don).
III. Hulland, *Linton.*

989. ***Fagus sylvatica*** L. Page 106.
I. Lee Hill, Cromford!

Castanea vulgaris Lam. (*C. sativa* Mull.). Page 107.
III. Robin's Cross, Repton, *Hagger.*

995. ***Populus alba*** L. Page 107.
II. Field near Renishaw, *Waterfall.*

Populus nigra L. Page 108.
III. Swarkestone!

1001. ***Salix fragilis*** L. Page 108.
VAR. ***britannica*** F. B. White.
I. Ashwood Dale!
III. Mickleover! Swarkestone! Normanton!

1002. ***Salix alba*** L. Page 108.
III. Markeaton! Littleover! Willington! Chellaston! Muggington!

1006. ***Salix rubra*** Huds. (*S. purpurea* L. × *viminalis*). P. 109.
I. Dovedale, *Linton.*
VAR. ***Forbyana*** Sm.
III. Near the General Cemetry, Derby!

July 1899.

1007. ***Salix viminalis*** L. Page 109.
I. Ashwood Dale!

1008. ***Salix Smithiana*** Willd. (*S. viminalis* × *Caprea*). P. 109.
II. Ashover, *Bailey.*

1008*. ***Salix rugosa*** Leefe. Page 109.
III. Bradley, *Linton.*

1010. ***Salix cinerea*** L. Page 110.
III. Ireton Wood!

1011. ***Salix aurita*** L. Page 110.
I. Mellor, *Hannan.*
III. Bradley; Yeldersley; Shirley, *Linton.*
× ***cinerea*** L. (*lutescens* A. Kern).
III. Shirley; Atlow, *Linton*, B.E.C. Report, pp. 310-311.
× ***Caprea.***
III. Atlow; Edlaston; Shirley, *Linton*, B. E. C. Report, pp. 311, 423.
× ***Smithiana.***
III. Shirley, *Linton*, B. E. C. Report, p. 310.

1012. ***Salix Caprea*** L. Page 110.
I. Lee Hill, Cromford! Chee Dale!

1029. ***Pinus sylvestris*** L. Page 110.
I. Lee Hill, Cromford!

1038. ***Listera ovata*** Br. Page 111.
I. Haddon, *Bindley.* II. Cresswell, *Fox.*
III. Mickleover; Radbourne, *Bindley.*

1039. ***Epipactis latifolia*** All. Page 111.
I. High Tor, Matlock Bath! Bradwell, *Fox.*
II. Near Holmesfield, *Fox.*

1041. ***Cephalanthera grandiflora*** Bab. (*C. pallens* Rich.). Page 111.
Newton Wood, *Mr. Coke* in Pilkington.

1045. ***Orchis Morio*** L. Page 112.
III. Mickleover, *Bindley.*

1046. ***Orchis mascula*** L. Page 112.
I. Lathkill Dale! Cromford, *Bindley*; Bradwell, *Fox.*
III. Radbourne, *Bindley.*

1051. ***Orchis pyramidalis*** L. Page 112.
II. Cresswell, *Fox.*

1054. ***Gymnadenia conopsea*** Br. (*Habenaria conopsea* Benth.). Page 112.
I. Bradwell, *Fox.*

1056. ***Habenaria viridis*** R.Br. Page 113.
I. Whatstandwell, *Friend.*

1060. ***Ophrys apifera*** Huds. Page 113.
II. Shireoaks, *Friend.*

1061. ***Ophrys muscifera*** Huds. Page 113.
II. Shireoaks, *Friend.*

1067. ***Iris Pseudacorus*** L. Page 113.
III. Findern, *Bindley.*

1072. ***Narcissus Pseudo-narcissus*** L. Page 114.
II. Scarcliffe Woods, *Waterfall.*
III. Spondon, *Bindley.*

1086. ***Allium ursinum*** L. Page 115.
I. Grindleford and Hathersage, *Fox.*
II. About Renishaw, *Waterfall.*

1099. ***Convallaria majalis*** L. Page 115.
I. Bakewell, *Friend*; High Tor, Matlock Bath!
II. Cresswell, *Fox.*

1101. ***Polygonatum multiflorum*** All. Page 115.
II. Pleasley Vale, *Friend.* Most likely Howitt's habitat.
Vide Top. Botany.

1103. ***Paris quadrifolia*** L. Page 115.
II. Omit, *Waterfall.*

1104. ***Tamus communis*** L. Page 116.
II. Cresswell; Norton and Totley, *Fox.*
III. Mickleover, *Bindley.*

Elodea canadensis Mich.
III. Findern; Markeaton, *Bindley.*

1109. ***Alisma Plantago*** L. [*A. Plantago-aquatica* L.]. Page 116.
II. About Renishaw, *Waterfall.*
III. Repton, *Hagger*; Mickleover, *Bindley.*

1110. ***Alisma ranunculoides*** L. Page 117.
II. Shireoaks, *Friend.*

1116. ***Triglochin palustre*** L. Page 117.
II. Near Clowne, *Waterfall*; Shireoaks, *Friend.*

1119. ***Potamogeton pectinatus*** L. Page 117.
II. R. Rother, near Renishaw, *Waterfall.*
III. Canal, Borrowash!

1123.****Potamogeton zosteræfolius*** Schum. Page 117.
III. Canal, Borrowash!

1124. ***Potamogeton crispus*** L. Page 118.
II. Between Stanton-by-Dale and Dale Abbey!
III. Canal, Findern, *Bindley*; Canal, Borrowash!

1125. ***Potamogeton perfoliatus*** L. Page 118.
II. Canal between Staveley and Renishaw, *Waterfall.*
III. Canals, Willington and Borrowash!

1132. ***Potamogeton natans*** L. Page 118.
I. Bradwell, *Fox.*

1136. ***Zannichellia palustris*** L. Page 119.
II. Shireoaks, *Friend.*
III. Repton Brook, *Hagger.*

1140. ***Lemna trisulca*** L. Page 119.
III. Pools, Stanton-by-Bridge!

1145. ***Sparganium simplex*** Huds. Page 119.
II. R. Rother, near Renishaw, *Waterfall.*

1146. ***Sparganium ramosum*** Huds. Page 120.
II. Renishaw Canal, *Waterfall.*
III. Mickleover, *Bindley.*

New. VAR. ***microcarpum*** Neum.
I. Dovedale! named by W. H. Beeby, A.L.S.

1151. ***Juncus conglomeratus*** L. Page 120.
III. Willington, *Bindley.*

1156. ***Juncus acutiflorus*** Ehrh. Page 121.
III. Breadsall! Repton Rocks!

1162. ***Juncus bufonius*** L. Page 121.
III. Mickleover, *Bindley.*

1163. ***Juncus squarrosus*** L. Page 121.
III. Wirksworth, *Bindley.*

1169. ***Luzula sylvatica*** Bich. (*maxima* DC.). Page 121.
I. Dovedale, *Bindley*; near Coombs Moss, *Waterfall.*
II. Quarry Dam, Park Hall Woods, *Waterfall.*
III. Anchor Church; Dale Abbey Woods, *Bindley.*

1170. ***Luzula pilosa*** Willd. (*L. vernalis* DC.). Page 122.
I. Lee Hill, Cromford! Whatstandwell, *Bindley.*

1200. ***Eriophorum vaginatum*** L. Page 123.
I. Derwent Edge, *Fox.*

1201. ***Eriophorum polystachyon*** L. (*E. angustifolium* Roth.). Page 123.
I. Stanage Edge, *Fox.*

1211. ***Carex ovalis*** Good. Page 124.
I. Breadsall Moor! Mickleover; Burnaston, *Bindley.*

1214. ***Carex remota*** L. Page 124.
II. Quarry Dam, Park Hall Woods, Spinkhill, *Waterfall*;
Canal bank, Renishaw, *Waterfall.*
III. Mickleover; Radbourne, *Bindley.*

1217. ***Carex intermedia*** Good. (*C. disticha* Huds.). Page 124.
III. Mickleover, *Bindley.*

1220. ***Carex muricata*** L. Page 125.
I. Haddon, *Bindley.*
III. Mickleover, *Bindley.*

1222. ***Carex vulpina*** L. Page 125.
III. Mickleover, *Bindley*; Canal, Derby!

1224. ***Carex paniculata*** L. Page 125.
Canal bank, Renishaw, *Waterfall.*

1228. ***Carex vulgaris*** Fries. (*C. Goodenowii* J. Gay). Page 125.
I. Haddon, *Bindley.*

1236. ***Carex pallescens*** L. Page 126.
III. Mickleover, *Bindley.*

1247. ***Carex sylvatica*** Huds. Page 127.
III. Radbourne; Repton Shrubs, *Bindley.*

1249. ***Carex Pseudo-cyperus*** L. Page 127.
III. Findern, *Bindley.*

1250. ***Carex glauca*** Scop. (*C. flacca* Schreb.). Page 127.
III. Mickleover, *Bindley.*

1251. ***Carex præcox*** Jacq. (*C. verna* Chaix.) Page 128.
III. Turnditch! Mickleover, *Bindley.*

1257. ***Carex hirta*** L. Page 128.
III. Mickleover; Burnaston, *Bindley.*

1258. ***Carex ampullacea*** Good. (*C. rostrata* Stokes). P. 128.
I. Buxton, *Bindley*; Chee Dale!
III. Mickleover, *Bindley.*

1259. ***Carex vesicaria*** L. Page 129.
II. Quarry Dam, Park Hall Woods, Spinkhill, *Waterfall.*

1260. ***Carex paludosa*** Good. (*C. acutiformis* Ehrh.). Page 129.
I. Haddon, *Bindley.*
III. Mickleover, *Bindley.*

1261. ***Carex riparia*** Curt. Page 129.
III. Mickleover; Findern; Radbourne, *Bindley.*

Phalaris canariensis L. Page 129.
III. Mickleover, roadsides, *Bindley.*

New. ***Setaria viridis*** Beauv.
III. Mickleover, railway banks, *Bindley.*

July 1899.

Agrostis vulgaris With.

New. VAR. ***mutica*** Doell.

I. Snake Inn, *Linton,* B. E. C. Report, p. 427.

1294. ***Arundo Phragmites*** L. (*Phragmites communis* Trin.). Page 131.

III. Mickleover; Radbourne, *Bindley.*

1302. ***Aira flexuosa*** L. (*Deschampsia flexuosa* Trin.). P. 131.

III. Mickleover, *Bindley.*

1309. ***Avena pratensis*** L. Page 132.

I. Chee Dale!

1310. ***Avena pubescens*** L. Page 132.

III. Mickleover, *Bindley.*

1311. ***Avena flavescens*** L. (*Trisetum pratense* Pers.). Page 132.

III. Mickleover, *Bindley*; Swarkestone!

1316. ***Koeleria cristata*** Pers. Page 133.

I. Matlock Bath, *Bindley.*

1317. ***Melica uniflora*** Retz. Page 133.

I. Via Gellia, *Waterfall.*

II. About Chesterfield, Omit an error, *Waterfall.*

III. Repton, *Bindley*; Repton Shrubs!

1318. ***Melica nutans*** L. Page 133.

I. Via Gellia, *Waterfall*; Cromford, *Bindley*; High Tor, Matlock Bath!

1320. ***Catabrosa aquatica*** Presl. (Beauv.). Page 133.

III. Swarkestone!

1321. ***Glyceria aquatica*** Sm. Page 133.

I. Cromford, *Bailey.*

III. Spondon! Findern, *Bindley.*

1322B. ***Glyceria plicata*** Fries. Page 134.

Mickleover, *Bindley.*

1331. ***Poa pratensis*** L. Page 134.

I. High Tor, Matlock Bath!

III. Mickleover, *Bindley.*

1333. ***Poa compressa*** L. Page 135.

III. Stanton-by-Bridge! Yeldersley, *Linton,* B. E. C. Report, p. 275.

Poa nemoralis L. Page 135.

VAR. ***angustifolia*** Parnell.

I. Chee Dale! named by C. Bailey, F.L.S.

1342. ***Festuca ovina*** L. Page 136.
III. Mickleover, *Bindley*.

1343. ***Festuca duriuscula*** L. (*F. rubra* L.). Page 136.
I. Blackwell Dale!
III. Mickleover, *Bindley*.

1346. ***Festuca elatior*** Auct. (L.). Page 136.
III. Mickleover, *Bindley*.

1348. ***Bromus giganteus*** L. Page 137.
III. Mickleover, *Bindley*.

1349. ***Bromus asper*** L. (*B. ramosus* Huds.). Page 137.
I. High Tor, Matlock Bath!
III. Mickleover; Radbourne, *Bindley*; Muggington!

1350. ***Bromus sterilis*** L. Page 137.
III. Mickleover, *Bindley*; Markeaton!

1357. ***Brachypodium sylvaticum*** Beauv. (*B. gracile* Beauv.). Page 128.
III. Mickleover, *Bindley*.

1358. ***Brachypodium pinnatum*** Beauv. Page 138.
II. Bolsover, *Linton*, B. E. C. Report, p. 429.

1366. ***Hordeum sylvaticum*** Huds. Page 138.
I. Stirrup Wood, Charlesworth, *Hannan*, not *Whitehead*.

1367. ***Hordeum pratense*** Huds. (*H. secalinum* Schreb.). P. 139.
III. Mickleover, *Bindley*. Between Chellaston and Swarkestone!

1368. ***Hordeum murinum*** L. Page 139.
I. Chapel-en-le-Frith, *Hannan*.

1370. ***Nardus stricta*** L. Page 139.
III. Mickleover, *Bindley*.

1378. ***Allosorus crispus*** Bernh. (*Cryptogramme crispa* R.Br.). Page 140.
I. Chinley Hills, near Chapel-en-le-Frith, *Mr. L. Howard* in Bot. Guide.

1379. ***Cystopteris fragilis*** Bernh. Page 140.
I. Via Gellia, *Waterfall*.
II. About Chesterfield, Omit, *Waterfall*.

1383. ***Polystichum aculeatum*** Newm. Page 140.
VAR. ***lobatum*** Sw. (*P. lobatum* Presl. var. *genuinum* Syme).
I. Blackwell Dale!
III. Trusley, *Bindley*.

1386. ***Lastrea Oreopteris*** Presl. Page 140. Horsley Car!

1391. ***Lastrea dilatata*** Presl. Page 141. Horsley Car!

1395. ***Asplenium viride*** Huds. Page 141.
I. Wormhill, *C. T. Green.*

1396. ***Asplenium Trichomanes*** L. Page 141.
I. Bradwell and Froggatt Edge, *Fox.*

1399. ***Asplenium Adiantum-nigrum*** L. Page 141.
I. Near Eyam, *Fox.*

1400. ***Asplenium Ruta-muraria*** L. Page 141.
I. Cressbrook, *Fox.*

1402. ***Scolopendrium vulgare*** Symons. Page 141.
I. Via Gellia, *Waterfall.*
II. About Chesterfield an error, *Waterfall.*
III. Mickleover, *Bindley.*

1410. ***Botrychium Lunaria*** Sw. Page 142.
I. Cromford, *Bindley.*
III. Mickleover, *Bindley.*

1411. ***Ophioglossum vulgatum*** L. Page 142.
I. Monsal Dale!
II. About Renishaw, *Waterfall.*
III. Mickleover; Radbourne, *Bindley.*

1420. ***Equisetum maximum*** Lam. Page 143.
III. Muggington!

1421. ***Equisetum umbrosum*** Willd. (*E. pratense* Ehrh.). P. 143.
It is feared that both the entries for this plant in my Flora are errors, as it has been searched for at Ashbourne in vain.

1422. ***Equisetum arvense*** L. Page 143.
II. Near Holmesfield, *Fox.*

1423. ***Equisetum sylvaticum*** L. Page 143.
I. Near Bakewell, *Friend*; Cromford, *Bindley.*
III. Kirk Langley, *Bindley.*

1424. ***Equisetum palustre*** L. Page 143.
III. Repton! Markeaton! Mickleover and Radbourne, *Bindley.*

1425. ***Equisetum limosum*** L. (Sm.). Page 144.
Var. ***fluviatile*** (L.).
III. Radbourne, *Bindley*; Morley! Repton!

Chara vulgaris L. Page 144.
III. Ponds, Tickenhall Lime Works, *Bloxam*! See Flora, p. 57.

INTEGRATION IN SCIENCE

(Presidential Address to the Yorkshire Naturalists' Union, delivered 14th December 1898).

SIR MICHAEL FOSTER, K.C.B., M.A., ETC.,

Secretary of the Royal Society, Professor of Physiology in the University of Cambridge, President of the Yorkshire Naturalists' Union for 1898.

We are told that when the world was young and the whole earth was of one language and one speech, men journeying from the East and coming to a plain in the land of Shinar, made bricks, burning them thoroughly, and with these strove to build there a city and a tower whose top might reach unto heaven. We are also told that as they wrought, raising their handiwork higher and higher, their language was confounded, so that they might not understand one another's speech, and hence could not carry out their work. They left off to build the city.

During the long years which have passed away since those early days, generations of men, still journeying from the East, have been making bricks of another kind, burning them more or less thoroughly, and with them have gone on building a city which they call the city of Natural Knowledge, have gone on raising higher and still higher a tower which they call the tower of Science. During these latter times, during the last two or three centuries, especially during this last century, the tower has risen rapidly, storey has been added to storey; and, indeed, some have thought, or have seemed to think, that its top was reaching unto heaven. But as the tower has been rising higher and higher, especially as the newer stories have been a-building, something of the fate of the old tower of Babel has fallen on the builders; their language is showing signs of being confounded; year by year they are becoming less and less able to understand each other's speech. The old example of the plain of Shinar bids every thoughtful man ask himself the question, is not this confusion of languages hindering and spoiling the work, even if it will not, as it did of old, stop it altogether? Cannot something be done to check this development of tongues, or at least to provide adequate interpreters?

Let me make use of the opportunity you have to-day offered me, by attempting to illustrate the reality of the danger which threatens us, and possibly to suggest some means to avoid or at least lessen it.

The Journal Book of the Royal Society of London for the Advancement of Natural Knowledge, contains the following record of the ordinary meeting of

[Copy.] Septemb: y^e^ 10^th^: 1662.

Mersennus his account of the tenacity of Cylindricall bodies was read by Mr. Croone, to whome the prosecution of that matter by consulting Galilæo was referred, when the translation of that Italian treatise, wherein he handleth of this Subject, shall be printed.

It was order'd, that, at the next meeting, Experiments should bee made with wires of severall matters of y^e^ same size, silver, copper, iron, &c. to see, what weight will breake them; the Curatour is M^r^ Croone.

The reading of the french Manuscript brought in by S^r^ Robert Moray about taking heights & distances by Catoptricks was differred, till the description of the instrument should come.

D^r^ Goddard made an Experiment concerning the force that presseth the aire into lesse dimensions; and it was found, that twelve ounces did contract $\frac{1}{24}$ part of Aire. The quantity of Aire is wanting.

My Lord Brouncker was desired to send his Glasse to D^r^ Goddard, to make further experiments about the force of pressing the aire into lesse dimensions.

D^r^ Wren was put in mind to prosecute M^r^ Rook's observations concerning the motions of the Satellites of Jupiter.

D^r^ Charleton read an Essay of his, concerning the velocity of sounds, direct and reflexe, and was desired to prosecute this matter; and to bring his discourse again next day to be enter'd.

D^r^ Goddard made the Experiment to shew how much aire a man's lungs may hold, by sucking up water into a separating glasse after the lungs have been well emptied of Aire. Severall persons of the Society trying it, some sucked up in one suction about three pintes of water, one six, another eight pintes and three-quarters, &c. Here was observed the variety of whistles or tones, which y^e^ water made at the severall hights, in falling out of the glasse again.

M^r^ Evelyn's Experiment was brought in of Animal engraftings, and in particular of making a Cock spur grow on a Cock's head.

It was discoursed whether there be any such thing as sexes in trees and other plants; some instances were brought of Palme-trees, plum-trees, hollies, Ash trees, Quinces, pionies, &c.: wherein a difference was said to be found, either in their bearing of fruit, or in their hardnesse and softness, or in their medicall operations: some said that the difference, which is in trees as to fertility or sterility, may bee made by ingrafting.

Mention was made by S^r^ Rob. Moray of a French Gentleman who having been some while since in England, and present at a meeting of the Society, discoursed that the nature of all trees was to run altogether to wood: which was changed by a certain way of cutting them, whereby they were made against their nature to beare fruit, and that according as this cutting was done w^th^ more or lesse skill, the more or lesse fruitfull the tree would bee.

A proposition was offered by S^r^ Robert Moray about the planting of Timber in England, and the preserving of what is now growing.

M^r^ Boyle shew^d^ a Puppey in a certaine liquour, wherein it had been preserved during all the hott months of the Summer, though in a broken and unsealed glasse.

We learn from the entries of the Society that there were present at that meeting men of very different callings and stations in life, noblemen, men of fashion, doctors, lawyers, soldiers, divines, and men of business as well as professors. They all seem to have appreciated all the diverse topics, and many to have given their opinions upon them. They each understood each other's speech. The tower had risen to a very little height in those days.

The Journal Book of the same Society in its record of the meeting of 16th June 1897, gives the following list of titles of papers read :—

Cerebro-cortical Afferent and Efferent Tracts.
H and K lines of the Spectrum of Calcium.
Enhanced Lines.
Stars of the δ Cephei Class.
Cleveite and other New Gas Lines.
Stress and other effects in Resin.
Lunar and Solar Periodicities.
A Maya Calender Inscription.
Morphology of Spore-producing Members.
Vector Properties of Alternating Currents.
Magneto-optic Phenomena of Iron.
The Chemistry of the Contents of the Alimentary Canal.
Discontinuous Variation in Biscutella lævigata.
Change of Absorption produced by Fluorescence.
The Electrotonic Currents of Medullated Nerves.
Variation and Correlation of Barometric Heights.
Openings in the Wall of the Body Cavity of Vertebrates.
Electrification of Air.
Mechanical Equivalent of Heat.

I make bold to say that neither the President of the Society, nor any other of the Officers nor any one of the Fellows, could, of his own knowledge, state what was the exact meaning of

each of all those titles. If you asked such a one to do it, he would tell you that he did not understand the speech of most of them. To-day, as of old, the Royal Society at each of its ordinary meetings listens to communications on diverse branches of natural knowledge; but not, as of old, are all the Fellows present, ready to offer opinions on most of the topics dealt with. A stranger at any of the meetings will often observe that, at the conclusion of the reading of a paper, or of the discussion sequent upon it, a number of those present will rise up and walk away. If he ask the reason, he will be told that these are physicists or chemists, and that the next paper is on a biological subject; or he may observe that while a paper is being read, some are paying no heed to it, but are reading or writing, or it may be slumbering or whispering. And if the stranger, fearing that such listlessness may be due to the worthlessness of the communication, and being unable to judge of its value, since he himself cannot understand it, should venture to ask one of these what the paper is about, he would probably receive as an answer, 'I have not the slightest idea.'

One day, when a botanical author was expounding, with the help of a projection lantern, certain remarkable results which he had obtained concerning the entrance of the pollen tube into the ovary, an eminent physicist, who was staying in the room to hear a physical paper later on, leaning over to an eminent biologist in front of him, whispered, 'Is it a disease?'

The tower has risen to a considerable height since the Royal Society was founded, and its Fellows are no longer able to understand one another's speech.

Nor is it merely the case that the votaries of one science speak a tongue strange to the followers of another science. Within what may be called one and the selfsame science, the builders often fail to understand one another.

The knowledge of living things stands sharply apart from all other kinds of knowledge; it constitutes a distinct science, which we sometimes speak of as 'biology,' though exception might be taken to the term, since Bios means 'the course of life,' 'the span of life,' rather than that which is at the bottom of the phenomena presented by living beings. This one science, the knowledge of living things, may be at once divided into the knowledge of plants, which we call botany, and the knowledge of animals, which we call zoology, using both these terms in their wider sense. Time was when the same intellectual

tendency which led a man to study plants, led him also to study animals, and it was at least the case that the man who busied himself about the one could readily hold converse upon their labours with his brother who was at work upon the other. Nowadays, when the eminent botanist or zoologist is led by circumstances over which he has no control to listen to a communication from his eminent brother in zoology or botany, he is, save in the rarest instance, fain to say, 'It is all Greek to me.' This mutual unintelligibility may in part be due to the increasing use of technical terms. Every year, almost every day, our language is, shall I say enriched or burdened? with new words, some quarried out of the Latin tongue, some out of the Greek, and some, to the great pain of the classical ear, made of bits of each stuck together; and the meaning of these new words becomes known only to those who make frequent use of them. But the real discordance goes far deeper than this. New terms are forced even upon those most unwilling to use them by the necessity of expressing new ideas; for each new idea must have its new sign, otherwise confusion also comes, though in a different way from that on which we are dwelling. The botanist and the zoologist fail to understand each other, not because they use different terms for the same idea, but because each one is gaining new ideas unknown to the other, and is doing that more and more as each science progresses.

Moreover, even within each of these two great divisions of botany and zoology, further sub-division has split up, and is unceasingly splitting up, the followers of biology into camps, each camp speaking its own tongue and understanding that alone. Both these branches of biology have, in this process of differentiation, followed lines of development more or less parallel, and the changes which have taken place in the one are analogous to those which have taken place in the other; what can be said of the one can also be largely said of the other.

If we take zoology in its wide sense, as the study of animals, we find that it naturally divides itself into three lines of investigation.

In the case of any animal we want to know its form and structure, of what parts it is made up, and how it is put together; we thus enter upon the study of anatomy or morphology. We also want to know how it lives, how it gets along, how it does what it does, and are thus led to the study of physiology. We further want to know how far it is like or

unlike to other animals, what are its relations, its affinities to other animals, and are thus brought to the study of taxonomy or of zoology in the narrower sense in which that word is sometimes used.

In the old time the student was in respect to anatomy content with a knowledge of the outward form and of such of the grosser details of structure as could be learnt by simple dissection, aided at most by nothing more than a simple lens. This gave him all which he at that time wanted for the determination of the relation of this or that animal to other animals for fixing its position in the animal world; it also supplied him with all the data which he supposed he needed for solving the problem as to how the animal performed this or that act. The same student was at once anatomist, zoologist, and physiologist. His physiology explained his anatomy as much as his anatomy explained his physiology, and his zoology was the outcome of the two. He readily passed from the one to the other, and was equally or nearly so at home in all three.

Nowadays we have changed all this.

The anatomist has pushed his analysis of animal structure to almost its farthest limit. Replacing the simple lens with an elaborate microscope, he has carried his inquiry well nigh to the bounds imposed by optical possibilities. His work can no longer be even largely carried on 'in the field'; the animal can no longer be anatomised on the spot where it is found, or in a natural condition; it has to be treated in special ways by special methods; the examination has to be conducted in a laboratory fitted up with special means.

He replaces the normal hues furnished by the red blood and by natural pigments with the stains of artificial dyes, purpling with gold, blackening with silver, and ransacking the colour shops to gain some new differential tint. He dips, and soaks, and washes, and soaks again, now in this fluid and now in that, having built up for him an art far exceeding in intricacy that of any fuller. He disintegrates with solvents, he hardens with corrosives, he supports the frail fragments of the tissues in beds of cunningly-contrived material, now hard as rock, now melting into fluidity, and calling in to his aid intricate instruments of precision which will cut with an accuracy defined by a small fraction of a millimetre, he prepares for study by displaying what was once an animal in the form of a riband, of a series of many hundred slices, each of vanishing thinness, and tinted with the colours of the rainbow.

One result is, that his conclusions can rarely be criticised or even appreciated and understood save by those who have passed through a training in his elaborate technique.

Moreover, the progress of his study has carried him on to problems essentially his own. He has left far behind the position in which he was content with physiological explanations, in which the question why a part or an organ had a certain form or structure, seemed to be answered by the fact of its being put to such and such a use. The anatomist now explains the phenomena of animal form and structure by referring them to what he calls morphological laws, laws deduced from the observation of a multitude of facts in different animals and in the same animal at different periods of its growth. In the determination of these morphological laws physiology appears to take no part, and the anatomist as morphologist becomes or seems to become more and more estranged from the physiologist.

Further, as the anatomist stretches forth his hand to lay hold of laws more and more general, of laws holding good over a larger and larger part of the animal kingdom, the little differences between this and that animal seem to him to be less and less worthy of his attention. The morphological comparison of extinct with living forms, of embryonic with adult forms, lead him, it is true, to construct phylogenies which, in his view, correctly define the relations and affinities of animals; and so far he still has to do with zoology, that is, with taxonomy. But in these phylogenic speculations he deals with the larger groups of animals only; he rarely, if ever, touches, still less weighs, the importance of those likenesses or unlikenesses, which are all in all to what we may call the zoologist proper who is busied with such small things as genera and species, and even worries himself about mere varieties. Thus the anatomist gets farther and farther apart from the zoologist, each of them less and less able to understand and appreciate the other.

In like manner the phyiologist who, in times of old, looked mainly to the facts of anatomy to help him in the solution of the problems how and why such and such action took place in the living body, has by the progress of his science been led to seek the solution of the new problems opening up before him, not so much in visible features of structure, whether large and seen by the eye, or minute and revealed only by the microscope, as in the hidden properties of matter common to non-living and living things, properties which men call physical and chemical. He, too,

has been brought to use methods all his own, and carries out his researches, not as largely of old by simple observation and reasoning, but by means of elaborate apparatus. He, too, can no longer work in the field. To pursue his inquiries he needs to be installed in a laboratory, which, in the complexity and variety of its fittings, rivals, if it does not excel, that of the physicist or the chemist. He looks upon all animals as mere material for experimental investigation. He has no interest in the affinities of this or that animal, for these are of little or no help to him, either by suggesting or guiding an experiment. The morphological laws of the anatomist are of no concern to him, and the only morphological facts which seem of any use to him, are those which suggest to him, that, in this or that animal the dispositions of this or that tissue or organ may offer him special facilities for the application of his experimental method. So far from being familiar with the language of the anatomist and the zoologist, the physiologist feels himself more and more at home in company with the physicist and the chemist.

Hence the zoologist, deserted alike by the anatomist and the physiologist, goes also his own gait. He is led more and more to make his own selection of the features of form and structure which he finds useful to him in the determination of affinities and in the laying down of systems of classification, regardless alike of the morphological or physiological significance of the facts with which he deals.

Anatomists, zoologists, physiologists, have thus from being brothers closely bound together become, through the very progress of their respective sciences, more and more estranged from each other. Instead of working hand in hand to build together the common tower of biology, each has been constructing his own chambers, not only without reference to, but in more or less complete ignorance of, what the others are doing. And now they are so far apart, that even when they wish to call to each other, they can rarely be understood.

This estrangement of those who ought to be closest companions has, moreover, been nursed into exaggeration by our present systems of education. The exigencies of modern life have, by the very necessity of things, given to the training of the young, whether at school or college, an increasingly formal character. The growing need that what is taught should directly aid the learner in the struggle for existence awaiting him in the future, and the corresponding wish to ascertain from time to time during the period of instruction whether the teaching has

been effective, has led to the present complicated system of formal examinations. These, instituted in the first instance at all events as mere aids and servants of teaching, have, by the mere force of circumstances, become its masters. The growth of the empire of examinations in these modern times is indeed a striking example of the power of machinery, of the triumph of the letter over the spirit.

Acknowledging that the object of teaching any branch of knowledge is to nurse the young mind in that branch so that it may not only learn the results already gained by inquiry, but be imbued with the spirit ruling that branch, the spirit which has gained much but promises more, it might seem not only unobjectionable but even salutary to test from time to time the progress of the learner. And were the test used simply to mark the advance of the learner, and not loaded with indirect consequences, its application might be of benefit and of benefit only. The test, however, is in nearly all cases so loaded; it is used, not merely as a guide to further instruction, but on its results are made to hang success or the reverse, rewards, or the withholding of rewards. And this has almost inevitably led to the teaching being directed, not so much to developing the learning within the pupil, as to fitting the pupil to meet the test. Hence, instead of the teaching determining the examination, it is the examination which to a greater and greater extent rules the teaching. Now the examination, even in the wisest and most skilful hands, is limited in its powers; moreover, it always tends to take on the characters of a machine. Certain things can with ease and fairness be tested by an examination; other things slip altogether through the examination net, or are judged insecurely and at times even wrongly. Hence, it has come about that the examination system, with its increasingly tremendous power, has placed a high premium on knowledge gained in what may be called a mechanical manner, and has tended to drive out of the schools all knowledge which does not fit the examination machine.

Hence in biology it has come about that the student is encouraged not only to study anatomy apart from physiology, but to devote himself to the study of the one to the exclusion of that of the other. For not only does the machine provide, or even insist upon, an examination in each, of such a kind that the other is wholly ignored, but also the rewards which attend success in the test, tempt or even compel the student to narrow his efforts to one alone, lest by attempting both he should fail in each.

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Moreover, in each study the machine heavily handicaps all knowledge which is not of a formal mechanical nature; it gives the prize to that kind of knowledge which best suits a pointed question and a succinct answer; for it works easily and exactly when it deals with the letter, but gets entangled and clogged when it tries to touch the spirit. Hence the student in anatomy, guided by the desire to come well out of the machine, spends his energies on the things of morphology, which can be swiftly learnt in the laboratory, with help of the microscope and the microtome, and afterwards deftly put down on paper; or busies himself with the formal questions of the school, in which the arguments for and against this or that view can be repeated with formal precision. In like manner the student of physiology, guided by a like desire, has his horizon likewise bounded by the laboratory and the discussions which arise out of laboratory work.

And what can I say of the study of zoology? That is either pushed out altogether, or made a mere appendage to anatomy, a something to illustrate morphological laws and phylogenic speculations, or, if it is allowed to have an independent existence at all, becomes a gathering of the dry bones of formal schemes of classification.

As the twig is bent so grows the tree. The influence of our modern teaching is to intensify the differentiation, and with the differentiation the narrowness and formal character of the biologic learning of our day.

There is a good old word, 'naturalist,' which, though it originally had to do with the nature of all things which exist, has in course of time been narrowed to the things which are alive. In this sense the naturalist was a man who busied himself with 'Nature' as manifested in living creatures, who sought to solve all the problems which life presents. Form, structure, function, habits, history, all and each of these supplied him with facts from which he wrested his conclusions. Observation was his chief tool, and the field his main workshop. To him invidious distinctions between different parts of biologic learning were unknown. He had not learnt to exalt either form or structure or function to the neglect of the rest. Everything which he could learn came to him as a help towards answering the questions which pressed on him for an answer.

A naturalist of this kind, however—a whole-minded inquirer into the nature of living beings—is for the most part a thing of the past. He has well nigh disappeared through that process of

differentiation of which I have spoken. He has, as we have seen, been cut up into little bits, and while the bits have flourished and grown great, the whole has vanished from sight. Not only so, but in the partition something has been lost. If you attempt to put the pieces together, you will find that they do not piece into a whole; gaps are left where fragments have fallen away.

Looking at the matter more closely, you will find that the one thing which is missing is just that upon observing which the old naturalist was chiefly bent. Watch the work of the modern morphologist, physiologist, systematist, whether he labours among plants or animals, be by his side in the laboratory or the museum, read what he has written; it is only in comparatively rare instances you shall find that in his discussions and speculations, in working out the morphological, physiological, taxonomic, systematic, conclusions to which he comes, he makes much use of, or even takes much count of, that which was the chief occupation of the naturalist of old, the study of the habits and ways of living things, such as can only be carried out in the field.

This is not a wholesome state of things. But how shall it be mended?

It is no use kicking against the pricks, it is no use attempting to go backwards, it is no use trying to stop the tide of differentiation on which I have dwelt; that will go on, must go on, swelling as it goes. We must look for help by going forwards, not backwards. And we may do so with hope, confident that the full development of difference will end by opening up the path to unity. We may indeed even now see signs that there is a goal before us toward which we may stretch.

The morphologist, when, having satisfied himself touching his lesser morphologic laws, he attempts to go beyond these, finds himself grappling with problems, to solve which he has to join hands with the physiologist from whom he has been parted so long. Along one line of inquiry he has already reached this point. Among the researches of the past few years, none are more pregnant than those in which the morphologist, studying the problems of embryology, has left the beaten track of tracing out the phases through which the developing animal successively passes in the normal course of events when left to itself, and has tried to see what happens when the ovum or the embryo is interfered with on its road. In doing so he has been putting his hand to the physiologist's chief aid in inquiry, the experimental

method ; he will not use that method long before he finds that he is struggling with questions which belong to the physiologist as well as to himself. In like manner, the physiologist is finding that the problems presented by the actions of the individual being, when these are pushed beyond a certain limit, carry him, as he seeks their solution, beyond the individual to the race, and land him in the same questions as those with which the morphologist has met. And the taxonomist is finding, or rather has found these many years past, that the affinities of animals or of plants, as they are determined by, so are they to be judged by a knowledge of, things which it is the province of the morphologist and the physiologist to make clear.

One, and perhaps not the least part of the many-sided good which Charles Darwin brought to biologic science was that the views which he made known have already served and promise to serve still more in the future as a chain, a golden chain, binding together the several branches of biologic study. The three great divisions of biology—morphology, physiology, and taxonomy — however divergent they may have been during the past, and may still seem to be, give promise of uniting again when they near their ultimate goal ; for that is one and the same for each of them. Whether you busy yourself with questions of form and structure, or of action and function, or of affinities and relationships, your inquiries all tend to the ultimate question how and in what way have all the phenomena of life come about? How did life originate? How is it renewed? And how in its origin and its renewal has it embodied itself in the long series of living beings, presenting differences of form and differences of function, and yet arranged in an order marshalled by some influences or other? It is one, I say, of the many merits of Darwin's work, that he anticipated, in a way, the final union of the three chief biologic studies. The origin of species is, by its very enunciation, a zoological problem, but the appearance of a variation is essentially a morphological problem, while the influence of the struggle for existence on the variation is no less a problem of physiology; a problem of physiology, however, in the wide sense of that word, not a problem merely of the limited mechanical physiology of the schools. In that wider sense physiology means the influence of circumstances of the surrounding world on the organism as well as the influence of the organism on the surrounding world. Whether we seek for confirmation or for refutation of the particular thesis put forward by Darwin, we

are led, whichever of the two be our motive, to consider a zoological problem from points of view which are at once morphological and physiological, and further, we are bid to pass beyond the museum and the laboratory, even though we may make full use of all that can be learned there, and go out into the field and watch Nature at work in her own way. It is not the least of the results of the direction which the theory of natural selection has given to biologic study, that it has led the biologist back to his earlier methods, and bid him scrutinise with care the ways of living things, how they tell upon and are told upon by the world around them. The outcome of the deepest, most far-reaching biologic inquiry has been the rehabilitation of the naturalist of old.

On the whole, then, we need not despond. We may boldly encourage the divergences of modern study in the sure hope that union will come in the end. We may bear with the confusion of tongues while the middle stories of the tower are a-building, feeling confident that the workers will once again understand each other's speech, and that the more clearly the nearer they reach to the top.

Meanwhile we may do what in us lies to help things onward towards the good end. So far as inquiry is concerned, it is as I have said, not by deprecating and attempting to check, but rather by encouraging and furthering specialisation and differentiation that we can hope to hasten the ultimate integration. As regards teaching, however, it might be wished that the paths along which young minds are led were not so narrow and not so bounded by high walls which shut in the view. It is a matter of regret that the enthusiasm of the young learner should be spent wholly on the museum and the laboratory, that he should be pushed by compulsion and drawn by rewards into morphological and physiological studies of the more formal and mechanical kind, while no encouragement is given to him to look Nature face to face in the field, and to catch direct from her lips the catholic teaching which she alone can give. But so long as all our teaching is made to pass beneath the heavy roller of a rigid examination system which flattens out everything over which it is dragged, I see no hope of change. Some kinds of learning may, perhaps, be consolidated by the pressure of the roller, but that of the naturalist will be squeezed out of him altogether. Such naturalists as we may hope to rear must be raised apart from, and indeed in spite of, the schools.

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Learning, of one kind and another, from the times of old, has been encouraged and supported by societies instituted for that purpose, and general biologic learning, the studies which keep in view the fundamental unity of the knowledge of living things, may be greatly aided by such societies, and that in very different ways.

On the one hand, such an encouragement of general integrating biologic studies, as indeed of like studies in other fields of science, is, I venture to think, one and not the least important of the functions of the Royal Society of London. At its origin it was the only scientific society in England, and as we have seen took all the sciences in charge. Since that time, and especially in these latter days, societies have been formed in respect to most of the several sciences for the purpose of doing for each what the Royal Society desired to do for all. In great measure these children have taken up the work of their mother, and relieved her hands. But none of them is in a position to do what she alone can fitly do, none can bring to bear upon a general question, involving more than one science or more than one branch of a science, the energies of minds trained in wholly or greatly differing studies. The Royal Society possesses an integrating power absent from other special societies, and, wielding this power aright, may greatly aid the consummation of that unity of biologic studies which we so much desire.

On the other hand, societies such as the one to which I now have the honour of speaking, have a no less important function. Your society, if I judge its aims and work aright, is also an integrating machine of no small power. By your very circumstances you are precluded from devoting yourselves to any narrow end, from making yourselves the slaves of any school. You are not 'cabinned and cribbed' in any building, you are not trammelled by any traditions, you are not confined to any special line of study. The field is your laboratory, Nature herself is your teacher, and you can roam at your will over all the pastures of biology, without the let and hindrance of prescribed study and academic ordinance. You are the complement of the University and of the Special Society, and it is your privilege, and in the interests of science your duty, to nurse and cherish that which they, willingly or unwillingly, neglect. It is for you to see that the naturalist of old does not die out; and indeed, as elsewhere, learning goes on its way differentiating and narrowing more and more, your work is more and more called for. It is for you, and such as you, to gather and preserve the bits of knowledge which

help to bind together diverging inquiries carried on in other places, it is for you to keep free from the rust of disuse the simpler way of asking questions of Nature, without the complicated machinery which others use; the simpler way, which often brings answers of no little moment in their right place; the simpler way, which others may be apt to overlook.

One little bit of advice, perhaps, I may be so bold as to offer you; if it is needless you will forgive me. Your main work is to preserve and keep intact from the destructive influences which are withering him, the good old naturalist of old, and so to serve as an integrator of biologic studies. To carry on this work efficiently, you must, so far as you can, keep yourselves in touch with the modern developments of our science. Should your ranks be joined by an academic neophyte, trained exclusively in the newest morphologic school, accustomed to view an animal form only through the long vista of a lengthy ribbon of gorgeously stained microtome-cut sections of exquisite thinness, and should you find that in the field, with only homely objects of observation before him, he is, literally speaking, 'all abroad,' do not thereby be tempted to look down on his attainments and his methods. Seek rather to bring his results into line with those of your simpler ways. So far as you can, work the one in the other. And in like manner with the gains and the manners of other schools of inquiry. Strive so far as you can, to fit the results of these various methods into those of your own more straightforward ways. Doing so, you will enlarge the power of the naturalist without spoiling his character, and will increase manifold your office of integration.

Such advice, however, I feel sure is needless. One sure token of this is that you have entrusted to me, an academic person, a man moving in a narrow groove, with no claim whatever to the grand old name of naturalist, the honourable duty of addressing you on this occasion as your President.

NOTE—ORNITHOLOGY.

Autumnal Immigration of the Goldcrest as observed in Holderness.—The Golden-crested Wren (*Regulus regulus*), the smallest of British, and indeed of European, birds, appears to be very fond of making its departure to and arrival from Norway and Sweden in *central* Holderness. Last October, on their return migration, *hundreds* were seen in the hedgerows and bushes near the cliff at Rowlston and Mappleton, near Hornsea. In the latter part of April this year a great departure in similar large numbers was made from Aldborough, a few miles further south. —B. B. Haworth-Booth, Hullbank Hall, Hull, 3rd May 1899.

NOTES—BOTANY.

Ray's and Nicolson's Early Cumberland Plant-Lists.—In a most readable notice of 'James Petiver and his Collections,' in the 'Antiquary' for April 1899, p. 112 and seq., Mr. G. L. Apperson tells us that the year 1695 marked Petiver's first appearance as an author, as in that year was issued Gibson's Edition of Camden, to which Petiver contributed the list of Middlesex plants. Says Mr. Apperson :—'Ray contributed these lists in every case save one,' i.e., Middlesex. This is almost correct, for Archdeacon Nicolson, of Carlisle, supplemented Ray's short contribution to Cumberland, and his list is in most part his own, while of Ray's five species four were due to others, i.e., two to Willisel and one each to Lawson and Newton. This is not said to discount in the least this first attempt towards topographical botany, but as a sample of south country treatment of a north country matter.—S. L. PETTY, Ulverston, 3rd April 1899.

Parable of the Mustard Seed.—I have received a reprint from the 'Thirsk and District News' (no date) of a lecture by Mr. William Foggitt, J.P., of Thirsk, on 'The Natural History of the Bible.' With the main matters our journal has no business, but with some portions Yorkshire botanists may be interested. Speaking of the parable of the mustard seed, he says that in his young days he had never seen the plant more than two or two and a half feet high, but a few years ago, in a field of Mr. Rooke's, one mile south of Thirsk, he saw a number of plants, with stout stems and strong, spreading branches, which he recorded as four and a half feet high, and two years subsequently he saw some taller still, in any of which the so-called 'fowls of heaven' could have lodged. It must have been a good lecture, judging from the range of topics and the known ability of the lecturer. 'It is a far cry to'—well from pre-Adamite man to the Unicorn, with 'pigeon's milk' on the way, for we are told that *ornithagalum* bears that interpretation.—S. L. PETTY, Ulverston, 3rd April 1899.

Blea and Watendlath Tarns in Baker's 'Flora of the Lake District.'—In the April number of 'The Naturalist' Mr. Waterfall calls attention to some uncertainty in the naming of these tarns in the 'Flora' as the habitats of certain plants.

Mr. Baker speaks of 'Blea Tarn' (p. 24), 'Blea Tarn, 500 yds.' (p. 142), 'Little Langdale Blea Tarn' (pp. 173 and 215), 'Blea Tarn, Watendlath' (p. 175), and also of 'Watendlath Tarn' (pp. 197 and 247), 'Upper Watendlath Tarn' (pp. 24, 95, and 217). He also mentions 'Bleawater' (p. 182).

There are three Blea Tarns in the Lake Country: one in Little Langdale (612 ft.), another in Eskdale above Boot (700 ft.), and a third at the head of the Watendlath Valley (1,562 ft.). There is also Blea Water (1,584 ft.) in Mardale under High Street. This is likely to be the 'Blea Tarn, 500 yds.,' because the Watendlath Blea Tarn is distinguished elsewhere by name, but it is probable that both contain *Littorella*.

There is only one Watendlath Tarn (847 ft.): this is certainly Baker's 'Lower Watendlath Tarn.' By the 'Upper Tarn' I feel sure that Dock Tarn (1,322 ft.) is meant. This is usually reached from Watendlath Tarn and hamlet, to which place, although draining into another valley, it lies much nearer than does Watendlath's own mother tarn Blea. Mr. Baker especially mentions (p. 24) that the White Waterlily is very fine in the 'Upper Watendlath Tarn,' and I have never seen this noble plant in greater perfection than in Dock Tarn, where it occupies a great part of the centre of the water, growing in a beautiful crescent-shaped mass. It is worth a long journey to visit it in July, when it is in bloom. Dock Tarn is unusually sheltered in its high position, lying deep amongst heathery knolls. Watendlath Blea Tarn (which can be the only other competitor for the name 'Upper Tarn') lies, on the other hand, bleak and bare. The Waterlily certainly does not flourish there, for few plants brave the wind above its waters, although under their shallower margins *Subularia* and *Isoetes lacustris* take refuge in great abundance, and probably also *Lobelia Dortmanna* and *Littorella*, which are pretty common throughout the district.—A. H. PAWSON, Farnley, Leeds, 17th April 1899.

WATER-PLANTS AS LAND-WINNERS.

ALBERT HENRY PAWSON, F.L.S.,
Farnley, Leeds.

The struggle for life which seems to be the ruling power of the animal and vegetable world, to which our biologists refer all the modifications and varieties of the objects of their study, is not confined to organic things alone. The solid crust of the earth is engaged in like warfare; land and water are in perpetual conflict. This is a true war of the Titans: it is like a battle among the gods. All the four elements are drawn into the struggle. Fire takes the side of the Land, and Air joins itself to Water; but these last are in their nature fickle and uncertain, and they do not always prove themselves trustworthy allies. The sea wastes the shores and crumbles the cliffs on one coast, at another point he is driven back by shoals and sand-banks. Rains and frost and wind wear down the mountains, but the routed battalions rally again on the lower ground, filling up lakes and forming deltas. In one place the land sinks, in another it is thrown up. So the war rages unceasingly with varying fortunes.

Neither are the citizens of the animal and vegetable kingdom altogether neutral in this strife. It is the land which really nourishes all of them, and they have thrown in their lot with it, and in building up coral islands and in filling up swamps and fens they greatly further the cause which they have espoused. The old proverb, 'It is an ill wind that blows nobody any good,' will serve us in this case also. In the erosion and redistribution of the land which is continually taking place it must be allowed that the balance of advantage lies with man. If we lose something on one shore line we gain it on another, and in the rich deltas about the mouths of our rivers and in our fertile valleys and deep alluvial plains we find our chief wealth. It is certainly to our profit that the hard rocks are ground up into cornfields, that the soil is removed from bleak heights where it will not reward the tillage and that it is spread out in the warmth of a lower level, that the whole country is being flattened, however gradually, for the plough.

It is to the part which plants play in increasing the land surface that I wish to refer - plants which grow everywhere in our own country and which come under our own observation, as Reeds, Sedges, Rushes, and floating water-plants. There are

several ways in which these plants tend to diminish the water-space and to increase the dry land. By their own decay they form vast masses of vegetable soil in shallow waters and on water margins; by occupying running streams they moderate the flow of the current and give it time to deposit its silt; by their creeping rhizomes and spreading roots they fix the bed of a stream and prevent it from being scoured and deepened by floods, and again in times of flood they serve as a sieve or strainer, arresting all floating and much suspended solid matter.

In England we have not to do with mangrove swamps and the jungle shrubs of tropical deltas, and yet even on the sea-shore there are plants which are helping the land to fight the waves. Many small herbs flourish on the brackish mud-flats where the shore is gaining on the sea, and by fixing the soil with their roots and by retaining the mud which every high tide throws over them they aid in securing the conquest. These are chiefly *Chenopodiaceæ*, with some Grasses and Rushes, and their work may be well seen on the northern shores of Morecambe Bay. Where the wind blows the sea-sand into hillocks and dunes it is the Marram-grass which renders them firm and stationary, so that in many places a penalty is enforced on those who disturb it.

But it is our freshwater plants that we must chiefly consider, and these are nearly all herbs and for the most part Grasses and Sedges and their allies. The margin of the water seems to nourish vegetation better than the land; it is noteworthy that the various species which choose shallow water or the edge of the water for their home are nearly all the most robust of their family. The common Reed is by far the largest of our grasses, taking bulk as well as height into consideration, and next to it, and at a long interval from those of the land, come other water-grasses, as *Digraphis* and *Glyceria aquatica*. The same rule holds good of the Sedges and other *Cyperaceæ*. The Club-rushes and Bulrushes are large plants, so are the Water-flag and the Bur-reeds; the Hairy Willowherb, the Loosestrifes (purple and yellow), the Hemp Agrimony, the Flowering Rush, the Great Spearwort and the Arrow-Head, the Fen Ragworts (now, alas, all but extinct!), and the Marsh Umbellifers, *Cicuta*, *Sium*, *Œnanthe*, and *Peucedanum* are among the stoutest of our native herbs.

It is, no doubt, the necessity of preserving themselves from being overwhelmed that has made these water-plants so vigorous, but the consequence is that their annual rise and decay soon accumulates an enormous amount of vegetable

matter amongst which they flourish yet more luxuriantly, until at length the water is altogether excluded.

The Norfolk Broads are a network of fens and shallow meres formed along the lower course of several sluggish streams which drain an almost level country. They were formerly much deeper and more extensive than at present, and the city of Norwich—which is now almost in the middle of the county, twenty miles from the coast—was a sea-port in the time of the Plantagenets. Slowly but surely the marsh-plants are turning these fens into dry land. Some of them, although waist-deep, are almost grown up by the common Reed; only a narrow water-way shows the course of the stream, and the rest of the mere is a forest of this gigantic grass, which rises from the water on either side like a wall. In other broads, as Hickling, the smaller Bulrush takes the place of the Reed, and entirely overgrows the shallow water. In the opener and deeper places the *Stratiotes*, all submerged except its flowering spike, makes a thick subaqueous tangle, preparing a place for the Reeds and Rushes, as they in their turn will make ready for the plants of more solid ground.

Where a river enters a lake there is usually a wide stretch of Sedge and Flag, which forms a natural filter-bed. This is well seen in several of the Westmorland and Cumberland lakes, and notably at the head of Derwentwater. Here the stream, which in ordinary times flows in a well-cut channel, spreads, when in flood, its thick and turbid waters over a square mile of Rushes and Reeds before reaching the lake, and leaves behind it a thick deposit of mud and wreckage. Thus little by little the marshy delta advances and the meadows and pastures steal after it. If it were not for these filtering tracts of rank vegetation the swollen river would carry its solid freight far into the deep water and the process of lake filling up would be much slower.

The form of these water-plants is nicely adapted to this purpose. Firmly anchored by their tough, matted or creeping, roots in the soft ooze of the bottom, they rear aloft tall, upright, slender stems ranged in endless succession like a fine screen. They bow to the current but they do not break; they take their toll of the water and yield it free passage. Their leaves are all narrow and pointing upwards, so as to offer no unnecessary obstacle. In quieter water floating and submerged plants, generally with mesh-like foliage (as *Myriophyllum*, *Ceratophyllum*, *Hippuris*, *Hottonia*, *Utricularia*, *Anacharis*, the water *Ranunculi*, *Callitriche*, *Chara*, *Nitella*, and others), are very busy strainers and mud-gatherers, and

some of them, as the Pondweeds, are often unpleasant to handle on this account. There are water Mosses, too, which show like lumps of solid earth coated with black or green velvet, so much soil have these tiny plants contrived to amass.

Not many things in Nature are more beautiful than these fen plants as we may see them in the summer time in the marshes of our eastern counties or elsewhere. They court the full sunshine for they fear no drought. They stand safe and out of reach, like the old lake dwellers; neither man nor beast can harm them. Untouched, the Reed waves its silver plume, and the Sedges swing their jewelled tassels; indifferent to the greed of the passer-by the Great Spearwort displays its cups of polished gold, and the Sweet Flag unfolds its scented leaves; secure the white Water-Lily, though a treasure which a king might covet, floats on the still water. The common Reed, and the two *Typhæ* and *Scirpus lacustris* (which share among them the name of Bulrush) venture furthest into the water. With nodding plumes and banners flying, brandishing their tall clubs and maces, they stand waist-deep and yield no ground, well stayed by their branching root stocks which are fully as thick as their sturdy stems. In the open spaces between them, trusting in their shelter, many floating plants lie at anchor, some of them half submerged and unsuspected during a great part of the year, the Water Lilies, yellow and white, the prickly Water Soldier, the delicate Frogbit, and the lovely Water Violet; here, too, the hitherto unnoticed *Utricularia*, suddenly rivalling a tropical orchis, displays its splendid spike of bloom, and claims our homage for evermore. As the water grows shallower the scene is even more gay, for the purple Loosestrife is abundant, though the yellow one is less common, and here the fern-like foliage of the Marsh Umbellifers, Water Hemlock, and Hogs' Fennel grows about gay clumps of lilac Hemp Agrimony, and Yellow Iris, and rosy Flowering Rush. Water Plantains, Marsh Speedwells, and Stitchwort, and floating grasses bring us to the Mints and the smaller Rushes, and the dry land. Inch by inch as the result of this accumulation and decay, the land creeps in upon the mere; more and more solid grows the edge; the aqueous plants retreat from the too shallow margin, the terrestrial plants advance, finding firmer footing; the Sedges and Reeds crowd on their floating neighbours which need space, and cannot endure their shade; these, too, press forward and the open water grows less and less; it is invested on every side, and it is plain that its complete subjugation is now only a matter of time.

PRESIDENTIAL ADDRESS
TO THE LINCOLNSHIRE NATURALISTS' UNION:
DELIVERED AT LINCOLN, 24TH NOVEMBER 1898.

REV. WILLIAM FOWLER, M.A.,
Vicar of Liversedge, Yorkshire; President of the Lincolnshire Naturalists' Union, 1898.

IF I take Lincolnshire Botany as my subject for to-day, it is not that I either undervalue or am uninterested in other branches of natural history. In a union such as ours, some are specially interested in the geology, others in the zoology, others again in the botany of our county; and it is well that it is so, for (even if we could give up all our time to the study of nature) so vast is the subject that we should be utterly unable to master it. Most of us, however, if not all, have daily work to do in connection with our profession, or trade, as the case may be, and it is only as a relaxation that we can either study natural history at our homes or collect objects for study on those excursions into the country, which are so health-giving, so instructive, and so enjoyable. There are very few who can devote more than a small portion of time to any one branch of natural history, to say nothing of other branches. Still, it is not always those who have the most leisure who do the greatest amount of work. Perhaps the very opposite is nearer the truth. In my experience excellent work has been done by many before or after business hours. Without any neglect of the duties pertaining to their daily occupation, they have found interest and pleasure in natural history studies, and have, in addition, greatly increased the stock of knowledge, both in their own department and in those of others. It is one of the great advantages of a union such as ours that, whatever branch it be to which we give our chief attention, we can receive help from, and give help to, those whose special interest is in other branches. If the geologists disinter from the rocks remains of vegetable and animal life, botanists and zoologists are helpful to them in deciding to what class, or order, or genus those remains belong. If the botanists find that certain plants will only grow on particular soils, the geologists are of assistance to them in telling them what are the constituents of those soils. If the entomologists are in search of insects which feed on special plants, the botanists can be of service to them in pointing out to them those plants, or informing them where they may be

found; while, on the other hand, if the botanist meets with a plant infested by galls, or denuded of its leaves, he can learn from the entomologist what the insects or larvæ are which have been the cause. We are field-naturalists, but we are a *union* of field-naturalists, ready to receive or give help as occasion may arise; chiefly interested, no doubt, in our favourite study, but not so absorbed in it as to work only for ourselves and to be indifferent with regard to all knowledge which is not directly connected with geology, botany, or zoology as the case may be. We are collectors of natural history objects, but we are not collectors only. The times at which, the circumstances under which, the places in which, they occur are noted by us, and their mutual relations are studied by us. We collect, not in order to be able to say we have a larger number of specimens than others, but in order to draw conclusions as to the distribution of animal and vegetable life, in time and space, or to enable others to draw them. Hewett Cottrell Watson was a collector of plants, and the head of a band of collectors, but those who are acquainted with his works know what valuable service he rendered by his topographical division of Britain, by his demarcation of climatic zones, by his grouping of species under six types of distribution. It is only when collection of specimens is regarded as an end, and not as a means to an end, that it can be said to be of little value. It was once said to me, 'any fool can collect,' but my reply was, 'Yes, but it is not any fool who can see the significance of what is collected.'

Now our work, I take it, as Lincolnshire field naturalists is, to find and record what our county contains in the first instance, and from the results and comparison with those obtained in other counties, to draw what conclusions we can in the second. Of the Fauna I do not feel competent to speak, though I frequently hear of the discovery of species not before known to occur in the county, and of observations which are of great value to those interested in distribution. This is certainly the case with regard to the Flora. Of late years our enthusiastic Secretary has not only made several additions to it himself, but has stirred up many others to search for and send to him records and specimens, which have taught us much as to their distribution and as to the soils on which they grow, and which have formed valuable additions to the County Herbarium, itself a proof of his interest, skill, and industry. Whenever a flora of Lincolnshire is written, his systematic and exhaustive method of recording will immensely lighten the labour of the

author, whoever he may be. Not many years ago comparatively little was known of Lincolnshire botany, but that is not the case now; at any rate with regard to flowering plants. Now and then a species new to the county may be discovered, but it is becoming more difficult every year to make any addition. The woods, the limestone quarries, the sandy warrens, the peat bogs, the drains, the gravelly and clay soils, and the sea-shore have been so well investigated that we know, practically, the species proper to each; so that, knowing the habitat, we can predict what is the nature of the soil, or conversely, knowing the nature of the soil, we can predict, to a great extent, what plants will be found on it. In Lincolnshire climate and altitude have little or nothing to do with distribution, so far as I can see. North or south, on hills or on plains, certain plants occur, if the soils suitable occur; if not, they are absent. It is a well-established fact that some plants require more lime, others more silica, others more salt, others more decaying vegetable matter, others more water than the average plant, and will not flourish unless they get it. Let me give you a single illustration. A friend of mine in Yorkshire has the wild Clematis (a southern species) growing in his garden. A few years ago he told me that, though it was to all appearance healthy, it never flowered. Knowing it to be a lime-loving plant (though in this instance growing on clay), I suggested that lime should be artificially supplied in the autumn. This was done, with the result that it flowered freely; but now, when the lime is exhausted, the Clematis has ceased to flower. Surely this is a proof that it was not northern air which prevented it from flowering, but the absence of food convenient for it.

Many similar instances might be adduced. In the same garden (and therefore in the same climate and the same altitude), highland and lowland, northern and southern plants are seen to flourish, if soil suitable to each be supplied. In a limited area, like that of Lincolnshire, the distribution of plants depends mainly, at all events, on the nature of the soil. A farmer once told me that, on removing from a limestone to a sandy neighbourhood, he had quite a different set of weeds to contend with, and the same would no doubt be the case were he to take a farm on clay or warp land, though in the same county. From this point of view even common plants are not without interest, showing, as they do, that they flourish best in soil congenial to them, and are much more dependent on it, than on climate or height above sea-level.

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But I must now hasten to give some idea of the richness of our flora. Through drainage and cultivation we have, I fear, altogether lost *Drosera anglica, Cicuta virosa, Peucedanum palustre, Senecio paludosus, S. palustris, Statice reticulata, Carex filiformis,* and *Lycopodium alpinum,* and are on the way to losing other rarities, such as *Lathyrus palustris, Selinum Carvifolia, Senecio campestris, Andromeda polifolia, Lysimachia thyrsiflora, Melampyrum cristatum, Iris fœtidissima, Maianthemum Convallaria, Acorus Calamus, Lastræa Thelypteris, Osmunda regalis,* and *Selaginella selaginoides.* When a plant only occurs in one station, the clearing of a wood, the filling up of a quarry, the digging of a drain, the cultivation of waste land, may at any time put an end to its existence, and as in a county like ours these works must needs go on, we shall have to reconcile ourselves to the loss of some of our rarest plants from time to time. But, though some plants which once occurred in the county are extinct, and some others seem not unlikely to become so, we can yet produce a list of species, which, though by no means common, are likely to continue with us and those who come after us. It would be tedious (at least to those who are not botanists) to enumerate all species occurring in the county, many of which are universally distributed. I shall therefore content myself with giving a list of those which, having only a limited distribution in Britain, are of special interest. Taking into consideration the fact that, as a rule, none but lowland species can be expected to occur in Lincolnshire, we have, I think, a fair share of uncommon plants, in addition to the very rare ones already mentioned. No flora can well be considered an uninteresting one, which contains such species as the following, to say nothing of many others, which (owing to their wide, if not universal, distribution in Britain) I shall not include.

Thalictrum dunense.
Thalictrum collinum.
Anemone Pulsatilla.
Myosurus minimus.
Papaver hybridum.
Fumaria Vaillantii.
Erophila præcox.
Cochlearia anglica.
Erysimum cheiranthoides.
Reseda lutea.
Viola stagnina.
Silene anglica.
Silene noctiflora.
Stellaria aquatica.
Stellaria nemorum.
Stellaria palustris.
Hypericum montanum.
Althæa officinalis.
Linum perenne.
Geranium rotundifolium.
Ulex nanus.
Medicago sylvestris.
Trifolium subterraneum.
Trifolium ochroleucon.
Trifolium scabrum.
Trifolium filiforme.
Astragalus danicus.
Vicia lathyroides.

Lathyrus Nissolia.
Potentilla argentea.
Drosera intermedia.
Myriophyllum verticillatum.
Callitriche obtusangula.
Epilobium roseum.
Bupleurum tenuissimum.
Carum segetum.
Sium latifolium.
Pimpinella major.
Œnanthe fluviatilis.
Caucalis arvensis.
Asperula cynanchica.
Senecio viscosus.
Arctium majus.
Arctium intermedium.
Cnicus eriophorus.
Cnicus pratensis.
Cnicus acaulis.
Crepis taraxacifolia.
Crepis biennis.
Lactuca virosa.
Specularia hybrida.
Statice occidentalis.
Anagallis cærulea.
Centunculus minimus.
Erythræa pulchella.
Gentiana Pneumonanthe.
Symphytum tuberosum.
Myosotis sylvatica.
Volvulus Soldanella.
Linaria Elatine.
Linaria spuria.
Antirrhinum Orontium.
Rhinanthus major.
Orobanche major.
Orobanche elatior.
Teucrium Scordium.
Herniaria glabra.
Chenopodium polyspermum.
Chenopodium murale.
Atriplex pedunculata.
Salicornia appressa.
Polygonum Raii.
Rumex maritimus.
Rumex limosus.
Daphne Laureola.
Hippophae rhamnoides.
Thesium humifusum.
Euphorbia amygdaloides.
Euphorbia portlandica.
Populus canescens.

Hydrocharis Morsus-ranæ.
Stratiotes aloides.
Epipactis media.
Orchis ustulata.
Ophrys apifera.
Ophrys muscifera.
Asparagus officinalis.
Colchicum autumnale.
Juncus compressus.
Juncus maritimus.
Juncus obtusiflorus.
Sparganium minimum.
Lemna gibba.
Lemna polyrrhiza.
Sagittaria sagittifolia.
Butomus umbellatus.
Potamogeton coloratus.
Potamogeton nitens.
Potamogeton decipiens.
Potamogeton angustifolius.
Potamogeton prælongus.
Potamogeton zosteræfolius.
Potamogeton acutifolius.
Potamogeton obtusifolius.
Potamogeton Friesii.
Potamogeton interruptus.
Ruppia spiralis.
Zanichellia pedunculata.
Zostera marina.
Zostera nana.
Scirpus caricis.
Scirpus rufus.
Cladium jamaicense.
Carex divisa.
Carex divulsa.
Carex elongata.
Carex Hudsonii.
Carex distans.
Carex extensa.
Carex Pseudo-cyperus.
Spartina stricta.
Alopecurus bulbosus.
Calamagrostis lanceolata.
Apera Spica-venti.
Deschampsia discolor.
Festuca Rottbællioides.
Festuca Myurus.
Bromus erectus.
Brachypodium pinnatum.
Agropyrum pungens.
Hordeum marinum.
Elymus arenarius.

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Very few of these occur in more than half of the 112 counties and vice-counties into which Britain was divided by Watson. As I have said, it is not probable that there will be more than a small addition in future to the list of Lincolnshire flowering plants, so well has the county of late years been worked. New stations will be found, perhaps, for species already recorded, but the day for recording species new to the county has well nigh gone by.

It must not, however, be concluded that there is nothing left for botanists to do. The non-flowering plants are full of interest, and though more difficult of determination than flowering plants, may be made out, by the exercise of patience, perseverance, and care. The Mosses and Hepatics, the Lichens, the Fungi, and the Algæ of Lincolnshire have been only partially recorded, and there is plenty of scope for useful work, if only those willing to give attention to them can be found. The flowering plants (on account of the size and beauty of many of them) are no doubt attractive objects for study, but the lowlier ones have their advantages. Many of them can be found at seasons of the year when flowering plants are few and far between, and have a beauty of their own when examined by the help of the microscope. They are, moreover, full of instruction for those botanists who are interested in the physiology and development of plant life, since the larger and most highly organised forms can only rightly be understood, when a knowledge has been gained of the smaller and lower forms. We have a few members in our union who have shown an interest in cryptogams, and I feel sure there would be more, if some were not frightened by imaginary difficulties. Minute organisms require, no doubt, more exact examination than large ones, but where one can see differences and resemblances another can, if equally patient and persevering. I hope we shall soon have more students of what are sometimes called 'the neglected orders.' I can assure any such that they will be rewarded by the sight of many beautiful and curious objects, and by a consequently fuller knowledge of plant life. They will also have the satisfaction of feeling that, instead of recording what has been already recorded again and again, they are adding fresh records, and so increasing the knowledge of the botany of the county. To such intending students I would recommend 'The Collector's Handy-book of Algæ, Desmids, Fungi, Lichens, Mosses, etc.,' by Nave, translated and edited by the Rev. W. W. Spicer, M.A., which gives instructions as to where these lower

plants may be found, and as to how they can best be obtained and preserved. It is published by Gibbings & Co., and though quite a small book, contains much interesting and valuable information. Every plant, whether flowering or non-flowering, is full of interest, when not only looked at, but examined. It is sometimes said of us botanists that the beauty of plants is lost upon us, and that our only pleasure seems to consist in pulling them to pieces. For myself, and I think for many others, I beg to decline accepting this view, and hold that our admiration is greatly increased, rather than diminished, by our knowledge of their structure, of their nourishment, of their habitats, and of the marvellous means taken for ensuring their reproduction. I have yet to meet with the botanist who is insensible to the beauty of the Pasque-flower, the Meadow Geranium, the Dropwort, and the Bee Orchis in our pastures; of the Marigold, the Blue Bottle, the Greater Yellow Rattle, and the Larger Hempnettle in our cultivated fields; of the Marsh Gentian, Grass of Parnassus, Bog Pimpernel, Buck-bean, Asphodel, and Andromeda on our boggy heaths; of the Wood and Tufted Vetch, the Rose, the Broad-leaved Campanula, the Yellow Loosestrife, and the White Convolvulus in our woods and hedges; of the White Water Lily, the Purple Loosestrife, the Yellow Iris, the Arrowhead, and the Flowering Rush in our drains and pools; of the Viper's Bugloss, Broom, Gorse, and Rest-harrow in our waste places. These, and many other smaller plants which I have not time to mention, are beautiful to behold, but the unscientific have not a monopoly of their beauty, as they sometimes seem to think. We, who study them, see all that they see, but much more in addition; and the more we know of them the greater is our admiration of them, and our reverence for their Maker. An interesting subject for those botanists who are favourably situated is that of the extension of maritime plants inland, by way of tidal rivers. Most of them seem unable to exist far beyond the Humber mouth, but a few of them not only live but seem at home on the Trent banks for a considerable distance, *Scirpus maritimus*, *Rumex maritimus*, *Aster Tripolium*, *Juncus Gerardi*, and *Glaux maritima* to wit. The seeds of many others must often be carried up by the Humber, but not developed, probably because they require more salt than the plants above-mentioned. I shall be glad if any members finding maritime plants inland will send me their names and stations, that they may be added to those I already have. With a better collection of data and comparison with those from other counties into

which tidal rivers run, we may be able at some future time to draw some interesting conclusions.

In conclusion, may I be allowed to urge upon all collectors of natural history objects the necessity of making notes in *writing* as to the time and place of collection? It is possible to forget these particulars in a few years; or the specimens may pass into other hands, and without such notes become almost valueless. I myself know of collections of fossils, of insects, of plants, which, in consequence of not being labelled, are all but worthless. If we have no information as to where and when a specimen is gathered, its chief interest for us is gone. I hope yet to see a County Museum, in which natural history objects may be safely stored and arranged, and so made useful to the many instead of to the few. I am convinced that, if such a museum were provided, interesting objects in every branch of natural history would be forthcoming, which at present are held back, and without it may eventually pass out of the county in which they have been gathered, and for which, consequently, they have the greatest interest. Till then, and in view of it, contemporaneous notes are of the utmost value, 'litera scripta manet.' In bringing my presidential year to an end, allow me to thank my fellow-members of the Union, for their readiness to give me information and to send me specimens, as also for their kind hospitality, without which it would have been difficult for me to attend all the meetings during the year. Though my lot is cast in another county, I was born in Lincolnshire, and botanised in it between forty and fifty years ago. Since then, I have generally spent my holiday in it, and always been interested in hearing of fresh discoveries and additions to our knowledge of its natural history. So I hope I shall continue to be. And if, in consequence of parochial and other engagements, I am unable to attend some of the meetings of the Union, I look forward to being present with you at others, and to keep alive friendships which I so highly value. With advancing years, bodily activity must needs decrease, but this should not be the case with the mental and spiritual part of our nature. To know more, and to be more, should be our aim, not thinking we know all because we know something, and not thinking ourselves perfect because we have made some advance. 'We know nothing yet, as we ought to know,' but we live in the hope that, hereafter, our partial knowledge will become complete, when 'that which is perfect is come, and that which is in part shall be done away.'

In Memoriam.

HENRY BENDELACK HEWETSON.

THE death of Mr. H. Bendelack Hewetson, at the comparatively early age of forty-nine, has caused a wide-spread feeling of regret amongst a large circle of friends and acquaintances,

H. Bendelack Hewetson.

many of whom have benefited by his skill as a surgeon. His loss, however, will especially be felt by his scientific friends and naturalists, members of the Yorkshire Naturalists' Union and

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the Leeds Naturalists' Club, of which latter he was four times President. It is not now our purpose to write of his distinguished position in the medical world, and his skill as a surgeon in all cranial diseases, but rather of his place amongst us as a naturalist, for Mr. Hewetson was much more than a doctor; in Natural History and other kindred sciences he was an enthusiast, and when off his regular work every spare hour of his life was given to the pursuit of his favourite studies. No one ever saw him idle. Whatever at the time was his special pursuit, that he did with his might.

Our first acquaintance with Mr. Hewetson commenced many years since in that corner of Holderness—the Spurn district—which he loved so well, and where subsequently he became a regular resident; a pleasant retreat at the end of every week's work in Leeds, and in holiday times of the year.

Mr. Hewetson was a keen archæologist, and in the last fifteen years of his life brought together a very interesting collection of prehistoric stone implements and pottery, also extinct animal remains from tumuli along the coast and searchings in the ancient forest bed, at low water mark. These relics of ancient man and beast were as they were got deposited and arranged by him in a small museum attached to his house, at Easington, best known to his friends as Mount Pleasant. Alas! how now memories crowd in of gatherings of naturalists at that hospitable board, of the *Noctes Ambrosianæ* there, or in the parlour of the little village inn, or the home of the two Lotens, father and son.

Mr. Hewetson's finds in his previous exploration of the 'kitchen middens,' exposed by the action of the sea along the coast of Holderness, were placed by him some years since in the Museum of the Hull Institution in George Street. Amongst many other things he collected some hundreds of coins, ranging over a wide period, found on the beach, washed out of those fast-vanishing clay cliffs by the united action of frost, rain, and sea. In fact, anything found in the neighbourhood was certain to find its way to 'the doctor,' for he had a host of friends and neighbours on the outlook who were, in a way, educated by him to take interest in these things.

Hewetson was a man of the quickest perception, and always took the greatest possible interest in noting, during the periods of migration, the various species of migrants which found a temporary resting-place in the district, and he assisted in adding several new birds to the avifaunal list of the county.

His notes, too, sent from time to time, to the writer, on the migration of insects, were of great and marvellous interest.

A cetacean of any sort, a seal, or any rare and curious fish or marine object cast up by the sea was certain to receive attention, photographed and described; nothing being overlooked or considered valueless or unimportant. No man was more capable of inditing the chronicles of a sea-side village.

During all the useful and busy period of his medical career in Leeds he found time for foreign travel, and in the course of years made two visits to Egypt, two to Morocco, also to Algiers and the Sahara. He had also spent holidays in the south of France and Italy, the Canaries and Cape de Verde Islands, and shorter visits to Norway, Sweden, and Holland. His last holiday, of any extent, was made under failing health to South America.

In all the places he visited he was unwearied in collecting and bringing home objects of interest, amongst these a large collection of bird skins from Northern Africa. Recently he presented a valuable collection of Egyptian antiquities to the Museum of the Philosophical Society of Leeds; also a fair collection of orchids from South America to the Hull Park gardens.

During these travels he also took hundreds of views with a hand camera, subsequently to be utilised as illustrations in his lectures. But he did not depend upon photography, he was an excellent artist and colourist, and nothing could exceed in fidelity of execution his water-colour sketches of nature, like those famous sketches of the Houbara Bustard shot at Kilnsea on 18th October 1896, pictures which were afterwards exhibited at Leeds.

Mr. Hewetson was a brilliant lecturer and a telling platform speaker; we were never more struck by this than when listening to his excellent remarks after our reading of Mr. Wm. Eagle Clarke's Report on Migration in the theatre of the Victoria University at the meeting of the British Association at Liverpool. His language was always good, and his ideas clearly and concisely expressed.

Mr. Hewetson was a Fellow of the Linnean Society and also of the Zoological Society, and more recently a Fellow of the Royal Geographical Society and a member of the British Ornithologists' Union, besides several local societies.

As a personal friend and a regular correspondent of more than twenty years, we are in a position to speak highly of his abilities and the versatility of his genius. His fault, if any,

was in not concentrating on one or two studies instead of taking up so many various matters which by the very nature of things could not be worked out in a busy professional life.

We well recollect, before failing health incapacitated him from exercise, our last visit to the coast together; this was early one morning in the autumn when the tide was low, and near the old warehouse on the Humber side. Immense flocks of various waders were gyrating wildly over the muds, from every side came the cries of birds, the shrill *klee-e-eep* of Grey Plover, *louey-louey* of the Godwits, the more distant *kleep-kleep* of Oystercatchers along the tide edge, shrieks of the angry Curlew. On the land side of the protective embankment Lapwings were all on the wing, careering and tumbling in an agitated fashion. What did it all mean this mighty disturbance of the bird population along leagues of shore? It was Hewetson who was quick to divine the cause. Pointing aloft he drew our attention to three magnificent Peregrines, barely out of gunshot, passing down the coast, their presence sufficient to disturb the various fowl and throw them into ecstacies of alarm.

Mr. Hewetson will be a much missed man in the Easington and Spurn districts, and memories of the 'good doctor' will linger amongst the fisher-folk and farmers when all present voices have become silent. His cheery manner and pleasant smile have comforted and buoyed-up many an old village worthy in his passage down the valley of shadows. Always anxious and willing to do a kind action to those he liked and who loved and respected him in turn.

An arm of aid to the weak,
  A friendly hand to the friendless,
Kind words, so short to speak,
  But whose echo is endless;
The world is wide—these things are small,
They may be nothing, but they are All.'

J. C.

NOTE—MAMMALIA.

Water Shrew in Dentdale, Yorkshire.—I forward you one of the mice which are in this valley, which I do not recollect seeing elsewhere. They are to be found along the mountain streams or brooks, and always near the water. It may be thought incredible, but is nevertheless a fact, that I have seen them *run* (not swim) along the bottom of the water, and run very fast too.—W. PRIOR, Gamekeeper to Lord Henry Bentinck, Deeside, Dent, Sedbergh, R.S.O., 3rd May 1899.

[The example sent was the Water Shrew, *Crossopus fodiens*.—W. D. R.]

Naturalist.

LIST OF DERBYSHIRE MOSSES.

REV. W. H. PAINTER,

Stirchley Rectory, near Shifnal, Corresponding Member of the Birmingham Natural History and Philosophical Society, and of the Birmingham Microscopists' and Naturalists' Union.

The only published list of South Derbyshire Mosses known is that which is included in 'The Flora and Fauna of Repton,' the joint work of the late Mr. W. Garneys, surgeon, of Repton, and of the late Mr. J. Hagger, F.L.S., one of the masters in Repton School.

MUSCI.

SECTION I.—ACROCARPI.

SPHAGNACEÆ.

1. ***Sphagnum acutifolium*** Ehrh.

I. Frequent on Kinder Scout, Charlesworth Coombs, and near Buxton, *Whitehead.*

III. Repton Rocks, *Repton F. & F.*

VAR. ***deflexum*** Schpr.

I. Kinder Scout, *Holt* in Whitehead's Derbyshire List.

VAR. ***lætevirens*** Braith.

I. Kinder Scout, *Holt* in Whitehead.

VAR. ***patulum*** Schpr.

I. Kinder Scout, *Holt* in Whitehead.

2. ***Sphagnum fimbriatum*** Wils.

I. Kinder Scout, *Whitehead.*

3. ***Sphagnum strictum*** Lindb.

I. Kinder Scout, *Holt* in Whitehead.

4. ***Sphagnum squarrosum*** Pers.

I. Charlesworth Coombs; Kinder Scout, *Whitehead.*

III. Repton Rocks, *Hagger*; Breadsall Moor, Brickfield, in fruit!

5. ***Sphagnum intermedium*** Hoffm.

I. Charlesworth Coombs; Kinder Scout, *Whitehead.*

6. ***Sphagnum cuspidatum*** Ehrh.
   I. Kinder Scout; Axe Edge, *Whitehead.*
   III. Repton Rocks, *Repton, F. & F.*

7. ***Sphagnum rigidum*** Schpr.

   VAR. ***compactum*** Brid.
   I. Kinder Scout, *Whitehead.*

   VAR. ***squarrulosum*** Russ.
   I. Kinder Scout, *Holt* in Whitehead.

8. ***Sphagnum subsecundum*** Nees.
   I. Kinder Scout; Charlesworth, *Whitehead.*

   VAR. ***contortum*** Schultz.
   I. Charlesworth Coombs; Kinder Scout, near Woodhead, *Whitehead.*

   VAR. ***auriculatum*** Schpr.
   I. Kinder Scout, *Whitehead.*

9. ***Sphagnum papillosum*** Lindb.
   I. Kinder Scout, *Holt* in Whitehead.

10. ***Sphagnum cymbifolium*** Dill.
   I. Charlesworth Coombs; Kinder Scout, *Whitehead.*
   III. Repton Rocks, *Hagger.*

   VAR. ***squarrulosum*** Nees.
   I. Near Buxton, *Ley*, 1869; Kinder Scout, *Holt* in Whitehead.

ANDREÆACEÆ.

11. ***Andreæa petrophila*** Ehrh.
   I. Charlesworth Coombs; Kinder Scout; Edale, *Whitehead.*

12. ***Andreæa crassinervia*** Bruch.
   I. Kinder Scout, *West*; near Woodhead, *Whitehead.*

WEISSIACEÆ.

13. ***Gymnostomum rupestre*** Schwg.
   I. (*Weissia rupestris* Schwg. Deep Dale, Buxton, *Ley*, 1886). Fernilee and Miller's Dale, *Barker* in Whitehead.

   VAR. ***ramosissimum*** Br.&Sch.
   I. Castleton, *Rogers*, 1881; Miller's Dale, 1882, *Holt* in Whitehead.

14. ***Gymnostomum calcareum*** Nees et Hornsch. (In excluded species, Lond. Cat.). *Mollia calcarea* (Nees et Hornsch.) Lindb., *Braithwaite, Moss Flora.*

I. On toadstone at Dale End, near Buxton; Monk's Dale, near Worm Hill, 1886; Miller's Dale, 1887, *Ley*; Chee Dale, *Holmes*, 1874; Monsal Dale, Raven's Dale, and Ashwood Dale, 1883, *Holt* in Whitehead.

15. ***Gymnostomum curvirostrum*** Ehrh.

I. Wet rocks, Castleton, *Holt* in Whitehead.

16. ***Gymnostomum commutatum*** Mitt.

I. Raven's Dale, *Holt,* 1883, in Whitehead.

17. ***Gymnostomum microstomum*** Hedw.

I. (*Weissia microstoma* Weiss. Buxton, 1869, *Ley*). Castleton; Monsal Dale; Miller's Dale and Lathkill Dale, *Whitehead.*

18. ***Gymnostomum squarrosum*** N.&H.

I. Banks at Mellor, 1868, *Scholefield* in Whitehead.

19. ***Gymnostomum tortile*** Schwg.

I. (*Weissia tortilis* Schwg. Miller's Dale, *Wild, Ley*). Lathkill Dale, 1838, *Wilson*; Ashwood Dale, *Whitehead.*

20. ***Weissia viridula*** Brid.

I. Banks at Edale; Whaley Bridge; Mellor and Cressbrook Dale, *Whitehead.*

III. Milton and Foremark, *Hagger*; Mickleover and Radbourne, *Bindley.*

21. ***Weissia mucronata*** Bruch.

III. Mickleover, *Bindley.*

22. ***Weissia cirrhata*** Hedw.

I. Buxton, 1869, *Ley*; rocks and walls, Charlesworth; Mellor and Whaley Bridge, *Whitehead.*

III. Repton, *Hagger*; Mickleover and Findern, *Bindley.*

23. ***Cynodontium Bruntoni*** B.&S.

I. Matlock, *Cash* in Whitehead.

24. ***Dichodontium pellucidum*** L.

I. Buxton, 1874, fruit, *Ley.* Wet rocks, Charlesworth; Kinder Scout; and Chapel-en-le-Frith, *Whitehead.*

VAR. ***serratum*** Schpr.

I. (*D. flavescens* Dicks.) Matlock and Rowsley, *Wilson*, 1834; Castleton, *Whitehead.*

25. ***Dicranella Schreberi*** Hedw.

VAR. ***elata*** Schpr.

I. Clay bank, Stirrup Wood, Charlesworth, fruiting, *Whitehead.*

26. ***Dicranella squarrosa*** Schrad.

I. Edale Head, 1881, *Ley*; Charlesworth Coombs and Kinder Scout, *Whitehead.*

27. ***Dicranella cerviculata*** Hedw.

I. Charlesworth Coombs and Kinder Scout, *Whitehead.*

III. Repton Rocks, *Hagger.*

28. ***Dicranella varia*** Hedw.

I. Youlgreave, 1876, *Ley*; frequent on clay banks, *Whitehead.*

VAR. ***callistoma*** Dicks.

I. Ashwood Dale, *Holt* in Whitehead.

29. ***Dicranella rufescens*** Turn.

I. Clay banks, Charlesworth; Mellor, Hayfield, Edale, and Coombs Moss, *Whitehead.*

30. ***Dicranella heteromalla*** Hedw.

I. Rowsley, 1876, *Ley*; common, *Whitehead.*

III. Common in the district!

31. ***Dicranum fuscescens*** Turn.

I. Charlesworth Coombs; Kinder Scout, *Whitehead.*

VAR. ***falcifolium*** Braith.

I. Charlesworth Coombs; Kinder Scout, *Scholefield* in Whitehead.

32. ***Dicranum scoparium*** L.

I. Frequent; Charlesworth Coombs and near Buxton, in fruit, *Whitehead*; Lea Hill; Cromford! Dovedale, *Bindley.*

VAR. ***orthophyllum*** Schpr.

I. Carmeadow, near Hayfield, *Holt* in Whitehead.

VAR. ***paludosum*** Schpr.

Kinder Scout, *Holt* in Whitehead.

33. ***Dicranum majus*** Turn.

I. Ashwood Dale, 1870, *Ley*; frequent, Fernilee, near Buxton, *Gordon* in Whitehead.

III. Mickleover, *Bindley*.

34. ***Dicranum palustre*** Bry. Brit.

I. Charlesworth and Kinder Scout, *Whitehead*; near Erwood, Buxton, 1874, *Ley*.

[***Dicranum Bonjeani*** DeNot.]

Charlesworth and Kinder Scout, *Whitehead*.

35. ***Dicradontium longirostrum*** Web. & Mohr.

I. Kinder Scout, *Holt*; Stirrup and Whitebottom Woods, Charlesworth, *Whitehead*.

36. ***Campylopus atrovirens*** DeNot.

I. Kinder Scout, *Gordon* in Whitehead.

37. ***Campylopus flexuosus*** Brid.

I. Charlesworth Coombs, Kinder Scout, and Cromford, *Whitehead*.

III. Repton Rocks, *Repton F. & F.*

38. ***Campylopus paradoxus*** Wils.

I. Kinder Scout, *Whitehead*.

39. ***Campylopus setifolius*** Wils.

I. Monk's Dale, fruit, *Barker* in Whitehead.

40. ***Campylopus fragilis*** B.&S.

I. Chee Tor, Matlock Bath; Miller's Dale, *Holt*; Mellor, *Whitehead*; Dovedale and Matlock, *Bindley*.

41. ***Campylopus pyriformis*** Brid.

I. Kinder Scout, *Holt* in Whitehead.

LEUCOBRYACEÆ.

42. ***Leucobryum glaucum*** L.

I. Moorlands near Buxton; Coomb's Moss, fruit, 1886, *Ley*; Charlesworth Coombs, Kinder Scout, and near Glossop, *Whitehead*; Whatstandwell, *Bindley*.

BRUCHIACEÆ.

43. ***Pleuridium nitidum*** Hedw.

I. Clay banks, Charlesworth and Chapel-en-le-Frith, *Whitehead*.

III. Mickleover, *Bindley*.

44. ***Pleuridium subulatum*** L.

I. Buxton, 1870, *Ley*; Mellor, *Whitehead.*

III. Milton, *Hagger*; Mickleover, *Bindley.*

45. ***Pleuridium alternifolium*** B.&S.

III. Ingleby, near Repton, *Hagger*; Mickleover, *Bindley.*

SELIGERIACEÆ.

46. ***Seligeria Doniana*** Sm.

I. Lathkill Dale, 1886, *Ley*; Ashwood Dale; Raven's Dale and Monsal Dale, *Holt*; shady limestone rocks, Castleton, *Whitehead.*

47. ***Seligeria pusilla*** Hedw.

I. Lover's Leap, Buxton, 1886; Monk's Dale, 1886; Lathkill Dale, 1890; Dovedale, 1891, *Ley*; Castleton, *Whitehead.*

48. ***Seligeria acutifolia*** Lindb.

I. Tideswell Dale, 1886; Litton Dale, 1887, *Ley.*

VAR. ***longiseta*** Lindb.

I. Raven's Dale and Monsal Dale, *Holt*; Lover's Leap, Buxton, *Wilson*, 1831; Tideswell Dale; Miller's Dale and Chee Dale, *Whitehead.*

49. ***Seligeria calcarea*** Dicks.

I. Taddington Dale, *Holt* in Whitehead; on Travertin, Via Gellia, 1887, *Ley.*

50. ***Seligeria tristicha*** Brid.

I. Miller's Dale, *P. Cunliffe*; Castleton, *Rogers* and *Cunliffe* in Whitehead.

51. ***Seligeria recurvata*** Hedw.

I. Kinder Scout and Monsal Dale, *Whitehead.*

52. ***Campylostelium saxicola*** Web. & Mohr.

I. Near Crich and Rowsley, *Wilson* in Whitehead.

53. ***Blindia acuta*** Hedw.

I. Kinder Scout and Edale, *Holt* in Whitehead.

POTTIACEÆ.

54. ***Sphærangium muticum*** Schreb.

I. Charlesworth, *Whitehead.*

55. ***Phascum cuspidatum*** Schreb.

I. Miller's Dale; Tideswell Dale and Chapel-en-le-Frith, *Whitehead.*

III. Milton, *Hagger*; Mickleover, *Bindley*.

56. ***Phascum bryoides*** Dicks.

I. Wormhill, *J. Vowell*, 1845; Miller's Dale, *R. Scholefield*; Buxton, *Wood*; Monsal Dale, *Ashton*; Chee Dale, *Whitehead.*

57. ***Phascum rectum*** Sm.

I. Miller's Dale and Monsal Dale, *Whitehead.*

58. ***Pottia cavifolia*** Ehrh.

I. (*Tortula cavifolia* Ehrh. Between Tideswell and Miller's Dale, *Ley*). Miller's Dale, *Cunliffe* in Whitehead.

59. ***Pottia minutula*** Schwg.

I. Miller's Dale, *Whitehead.*

III. Mickleover, *Bindley.*

60. ***Pottia truncata*** L.

I. Frequent, *Whitehead.*

III. Foremark, *Hagger*; Mickleover, *Bindley.*

61. ***Pottia intermedia*** Turn.

I. Miller's Dale, *Tetlow* in Whitehead.

62. ***Pottia Starkeana*** Hedw.

I. Buxton, *Hunt*, 1872, in Whitehead.

63. ***Pottia lanceolata*** Dicks.

I. Taddington Dale; Monsal Dale; and Miller's Dale, *Whitehead.*

64. ***Didymodon rubellus*** B.&S.

I. Frequent on walls, *Whitehead*; Dovedale, *Bindley.*

III. Shobnall, *Repton F. & F.*

VAR. ***dentatus*** Schpr.

I. (*Trichostomum rubellum* B.&S. var. *densum.* Ashwood Dale, 1887, *Ley*). Miller's Dale, *West* in Whitehead.

65. ***Didymodon flexifolius*** Dicks.

I. Moorland near Stanton, 1880, *Ley*; near Buxton,

Dr. Greville; Kinder Scout, *Holt*; Charlesworth Coombs, *Whitehead*; moors north of Manchester Road, Buxton, *West.*

66. ***Didymodon cylindricus*** Bruch.

I. (*Trichostomum cylindricus* Hedw. Brown Head, near Chapel-en-le-Frith, *Ley*). Kinder Scout, *Holt* in Whitehead.

67. ***Didymodon sinuosus*** Wils.

I. (*Tortula sinuosa* Wils. Lathkill Dale, Youlgreave, *Ley*). Monsal and Miller's Dales, *Holt*, 1883; Chee Dale, *Whitehead.*

68. ***Eucladium verticillatum*** L.

I. Monk's Dale, fruit, 1887, *Ley*; Peak Forest and Chee Dale, *Whitehead.*

69. ***Ditrichum homomallum*** Hedw.

I. (*Leptotrichum homomallum* Hampe. Wildmoor Clough, Buxton, 1874, *Ley*). Castleton, *Holt*; Stirrup Wood, Charlesworth Coombs; Kinder Scout, *Whitehead.*

III. Repton Rocks, *Purchas,* Braithwaite.

70. ***Ditrichum flexicaule*** Schwg.

I. (*L. flexicaule* Schwg. Common, *Ley*). Common on limestone, *Whitehead.*

Var. ***densum*** Schpr.

I. Monk's Dale, fine; Deep Dale, Buxton, 1886, *Ley*; Miller's Dale, *Holt*; Lathkill Dale, *Whitehead.*

71. ***Trichostomum tophaceum*** Brid.

I. Kinder Scout and Miller's Dale, *Whitehead.*

III. Mickleover, *Bindley.*

72. ***Trichostomum mutabile*** Bruch.

I. Dovedale, *Wilson*, 1867; Lathkill and Taddington Dales, *Whitehead.*

III. Repton, *Hagger.*

Var. ***cophocarpum*** Schpr.

I. Litton Dale, 1889, *Ley*; Chee Dale; Cave Dale, Castleton, fr.; Tideswell and Taddington Dales, *Whitehead.*

73. ***Trichostomum crispulum*** Bruch.

I. Monk's Dale, 1881; Raven's Dale, 1881; Dovedale,

1875, *Ley*; Cave Dale, Castleton, *West*; Chee Dale, *Holt* in Whitehead.

VAR. ***nigro-viride*** Braith.

I. Monk's Dale, 1886, *Holt* in Whitehead.

74. ***Trichostomum nitidum*** Lindb.

I. Dovedale, *Holmes,* 1875, in Whitehead.

75. ***Barbula brevirostris*** B.&S.

I. Ashwood Dale, *George*, 1873, in Whitehead.

76. ***Barbula rigida*** Schultz.

I. (*Tortula rigida* Schultz. Topley Pike, 1869-1886, Miller's Dale, *Ley*). Walls at Peak Forest and Topley Pike, *Whitehead.*

77. ***Barbula ambigua*** B.&S.

I. (*Tortula ambigua* B.&S. Topley Pike, 1876, *Ley*).

III. Repton, *Hagger.*

78. ***Barbula aloides*** Koch.

I. Topley Pike, 1870, *Ley*; frequent on walls in the limestone dales, *Whitehead.*

79. ***Barbula lamellata*** Lindb.

I. Near Miller's Dale Station, 1889, *Ley.*

80. ***Barbula muralis*** L.

I. Common on walls, *Whitehead*; Matlock Bath!

III. Repton, *Hagger*; Mickleover, *Bindley*; common about Derby!

VAR. ***rupestris*** Schultz.

I. Raven's Dale, 1881; Lathkill Dale, 1886, *Ley*; frequent on the rocks and walls in the limestone districts, *Whitehead.*

III. Dovedale, *Bindley.*

81. ***Barbula unguiculata*** Dill.

I. Frequent on the limestone; abundant at Matlock, *Whitehead.*

III. Mickleover, *Bindley*; Repton, *Hagger.*

VAR. ***obtusifolia*** Schultz.

I. Miller's Dale, *Holt*, 1882, in Whitehead.

82. ***Barbula fallax*** Hedw.

I. Frequent in Ashwood and Miller's Dales, *Whitehead.*

III. Mickleover, *Bindley.*

VAR. ***brevifolia*** Wils.

I. Buxton and Miller's Dale, *Holt*, 1883; Chapel-en-le-Frith, *Whitehead.*

83. ***Barbula recurvifolia*** Schpr.

I. Abundant in the limestone dales near Buxton, 1874; Ashwood Dale, fr., 1874, *Ley.* (*Barbula reflexa* Brid.) Walls, Chapel-en-le-Frith; Buxton and Miller's Dale; Matlock; Castleton, *Whitehead.*

84. ***Barbula rigidula*** Dicks.

I. Buxton, *Wilson,* 1864; Raven's Dale, 1881, *Ley*; Castleton, *Holt*; Whaley Bridge; Ashwood Dale, *Whitehead.*

85. ***Barbula spadicea*** Mitt.

I. Buxton, *Wilson*, 1863; Dovedale, *Holmes*; Castleton, *Whitehead.*

86. ***Barbula cylindrica*** Tayl.

I. Buxton, Matlock, and Castleton, *Whitehead.*

87. ***Barbula Hornschuchiana*** Schultz.

I. Topley Pike, 1881, *Ley*; Cromford, *Hunt,* 1863; Miller's Dale, *Holt* in Whitehead.

III. Shopnall, *Repton F. & F.*

88. ***Barbula revoluta*** Schwg.

I. Monsal Dale, 1881, *Ley*; walls, Buxton; Miller's Dale; Chapel-en-le-Frith, *Whitehead.*

89. ***Barbula convoluta*** Hedw.

I. Ashwood Dale and Topley Pike, 1874, *Ley*; frequent on banks and walls, *Whitehead.*

90. ***Barbula inclinata*** Schwg. (***Mollia inclinata*** Lindb.)

I. Staddon Heights, *Holmes*, 1867, in Braithwaite.

91. ***Barbula tortuosa*** L.

I. Very abundant on limestone, Buxton, 1869, *Ley*; Ashford, fr., *Nield* and *Ashton* in Whitehead; Matlock Bath; Dovedale, *Bindley.*

92. ***Barbula squarrosa*** Brid.

I. Lathkill Dale, *Whitehead.*

93. ***Barbula subulata*** L.

I. Abundant, Buxton, 1869, *Ley*; Miller's Dale, *Hagger*; frequent in limestone dales, *Whitehead.*

III. Repton, *Hagger.*

94. ***Barbula lævipila*** Brid.

I. Monsal Dale, *Holt*; trees, Dovedale; Chapel-en-le-Frith, *Whitehead.*

95. ***Barbula ruralis*** L.

I. Buxton, on limestone, *Ley*; Ashwood Dale; Wormhill; Dovedale; Castleton, *Whitehead.*

III. Foremark, near Repton, *Hagger.*

96. ***Barbula intermedia*** Brid.

I. Common on limestone, Buxton, 1869, *Ley*; walls in limestone dales, *Whitehead.*

97. ***Barbula princeps*** DeNot.

I. Near Buxton, *S. Ashton*; near Miller's Dale, *Cash* in Whitehead.

98. ***Trichodon cylindricus*** Hedw.

I. Matlock, *Wilson* in Whitehead.

99. ***Ceratodon purpureus*** L.

I. Common on walls and banks.

III. Common on walls and banks.

100. ***Distichum capillaceum*** L.

I. Ashwood Dale, *Holt* in Whitehead.

III. Gunn's Hills!

CALYMPERACEÆ.

101. ***Encalypta vulgaris*** Hedw.

I. Miller's Dale, 1871; Dovedale, 1875, *Ley*; Hartington; Dovedale, *Whitehead.*

III. Repton, *Hagger.*

VAR. ***pilifera*** Funck.

I. Castleton, Miller's Dale, and Lathkill Dale, *Whitehead.*

VAR. ***obtusifolia*** Funck.

I. Miller's Dale and Lathkill Dale, *Whitehead*; Dovedale, *Bindley.*

102. ***Encalypta streptocarpa*** Hedw.

I. Rather abundant on the limestone, *Ley*; Youlgreave, fr., *Bowman* in Wilson, Whitehead.

GRIMMIACEÆ.

103. ***Grimmia apocarpa*** L.

I. Walls, Ashwood Dale; Kinder Scout; Whaley Bridge, *Whitehead*; Dovedale, *Bindley*; Matlock Bath!

VAR. ***pumila*** Schpr.

I. Miller's Dale, *Holt,* 1879, in Whitehead.

104. ***Grimmia pulvinata*** Dill.

I. Frequent, *Whitehead.*

III. Repton, *Hagger*; Mickleover, *Bindley*; Belper and Duffield!

VAR. ***obtusa*** Hübn.

I. Tickwall, *Hunt,* 1863, in Braithwaite.

105. ***Grimmia tricophylla*** Grev.

I. Sandstone walls, Stanton, 1886, *Ley*; Rowsley, *Boswell*; Chee Dale, *Holt,* 1885; Kinder, near Hayfield, *Whitehead.*

106. ***Grimmia Doniana*** Sm.

I. Wall, Coomb's Moss, 1880, *Ley*; Axe Edge, *Holmes,* 1874; Charlesworth, *Tinker*; walls, Kinder Scout; Castleton; Fernilee, near Buxton, *Whitehead.*

107. ***Rhacomitrium aciculare*** L.

I. Moorland streams near Buxton, 1870, *Ley*; Charlesworth Coombs and Kinder Scout, *Whitehead.*

VAR. ***denticulatum*** Wils.

I. Kinder Scout and Stenior Clough, *Whitehead.*

108. ***Rhacomitrium heterostichum*** Hedw.

I. Stenior Clough, and near Buxton, *Whitehead.*

VAR. ***gracilescens*** Bry. Eur. (*Rhacomitrium obtusum* Sm.).

Kinder Scout, *Whitehead.*

109. ***Rhacomitrium fasciculare*** Schrad.

Charlesworth Coombs; Kinder Scout; Stenior Clough, and near Buxton, *Whitehead.*

110. ***Rhacomitrium lanuginosum*** Hedw.

I. Raven's Dale, 1881; Deep Dale, 1880; Lathkill Dale, 1886, *Ley*; Kinder Scout; Charlesworth Coombs and Chee Dale, *Whitehead.*

111. ***Rhacomitrium canescens*** Hedw.

I. Lathkill Dale, 1886, *Ley*; Fernilee, near Buxton, *Whitehead.*

VAR. ***ericoides*** Bry. Eur.

I. Fernilee; Chee Dale; Kinder Scout; Chapel-en-le-Frith, *Whitehead.*

112. ***Ptychomitrium polyphyllum*** Dicks.

I. Abundant on the Millstone Grit, near Buxton, 1869-1881, *Ley*; walls, Ashwood Dale; Furnilee, near Buxton; Kinder Scout, *Whitehead.*

113. ***Amphoridium Mougeotii*** B.&S.

I. Edale Head, 1881, *Ley*; near Woodhead; Stenior Clough; Kinder Scout; and Ashwood Dale, *Whitehead.*

114. ***Zygodon viridissimus*** Dicks.

I. Abundant on limestone, Buxton, *Ley*; on trees, Monsal Dale, *Holt*; Matlock and Chapel-en-le-Frith, *Whitehead.*

VAR. ***rupestris*** Lindb.

I. Ashwood Dale, 1867, *Hunt*; Castleton, Chee Dale, and Miller's Dale, 1886, *Holt* in Whitehead.

115. ***Ulota Drummondii*** Grev.

I. On trees near Whaley Bridge, *Scholefield* in Whitehead.

116. ***Ulota Bruchii*** Hornsch.

I. On trees, Monsal Dale, *Holt*; Dovedale and Castleton, *Barker* in Whitehead.

117. ***Orthotrichum anomalum*** B.&S.

VAR. ***cylindricum*** Schpr.

I. On limestone rocks and walls, rather frequent, *Whitehead.*

III. Trees and rocks, Repton, *Repton F. & F.*

118. ***Orthotrichum saxatile*** Brid.

I. Very abundant on limestone near Buxton, *Ley*; Dovedale, *Bindley.*

119. ***Orthotrichum cupulatum*** Hoffm.

I. Dovedale, 1886, *Ley*; frequent on limestone rocks and walls, *Whitehead.*

VAR. ***nudum*** Dicks.

I. Miller's Dale and Monsal Dale, 1884, *Holt*; Chee Dale, *Whitehead.*

120. ***Orthotrichum affine*** Schrad.

I. Very scarce near Buxton; hawthorn stems, Ashwood Dale, 1870, *Ley*; on walls, Chapel-en-le-Frith, and near Whaley Bridge; on trees, Topley Pike, *Whitehead*; Dovedale, *Bindley.*

VAR. ***rivale*** Wilson.

I. R. Wye, Cheedale, *Whitehead*, 1878; Miller's Dale, *Holt,* 1884, in Braithwaite.

121. ***Orthotrichum stramineum*** Hornsch.

I. Matlock Bridge, *Spruce*; Monsal Dale, *Holt* in Whitehead.

122. ***Orthotrichum tenellum*** Bruch.

I. Matlock Bridge, 1844, *Spruce* in Whitehead.

123. ***Orthotrichum diaphanum*** Schrad.

I. Miller's Dale; Matlock Bath; Fernilee, near Buxton, *Whitehead.*

III. Mickleover; Findern, *Bindley.*

124. ***Orthotrichum Lyellii*** H.&T.

I. On a tree, Ashwood Dale, *Whitehead.*

125. ***Orthotrichum Sprucei*** Mont.

I. On trees by the Derwent, Matlock, *Spruce* in Whitehead.

126. ***Orthotrichum rivulare*** Turn.

I. By the Wye, Chee Dale, 1878, *Whitehead.*

SPLACHNACEÆ.

127. ***Splachnum sphæricum*** L. fil.

I. Kinder Scout, *J. W.* in Whitehead.

FUNARIACEÆ.

128. ***Discelium nudum*** Dicks.

I. Milton Reservoir, Chapel-en-le-Frith, *Barker*; clay banks, Charlesworth, *Whitehead.*

129. ***Epherum serratum*** Schreb.

I. Hedge bank, Charlesworth, *Whitehead.*

III. Mickleover, *Bindley.*

130. ***Physcomitrella patens*** Hedw.

I. Milton Reservoir, Chapel-en-le-Frith, *Barker* in Whitehead.

VAR. ***Lucasiana*** Schp.

I. With the foregoing, 1887, *Barker* in Whitehead.

131. ***Physcomitrium sphæricum*** Schwg.

I. With the foregoing, 1893, *Barker* in Whitehead.

132. ***Physcomitrium piriforme*** L.

I. Mud of a pond, Buxton, 1890, *Ley*; Charlesworth, and Chapel-en-le-Frith, *Whitehead.*

III. Spurs Bottom, Repton, *Hagger*; moist bank, Mickleover, *Bindley.*

133. ***Funaria calcarea*** Wahl.

I. Deep Dale, 1870; Miller's Dale, 1872; Dovedale, 1886, *Ley*; Matlock and Miller's Dale, *Wilson*; Castleton; Wormhill and Taddington Dale, *Whitehead.*

134. ***Funaria hygrometrica*** L.

I. Common on banks and walls, *Whitehead.*

III. Repton Shrubs, *Hagger*; walls, Mickleover, *Bindley.*

BARTRAMIACEÆ.

135. ***Bartramia pomiformis*** L.

I. Goyt's Bridge, Buxton, 1869; Hollings Clough, 1870, *Ley*; Stirrup Wood, Charlesworth; Charlesworth Coombs; Kinder Scout, *Whitehead.*

III. Bank, Eggington, *Bindley*; Repton, *Hagger.*

136. ***Bartramia Œderi*** Gunn.

I. Lover's Leap, Buxton, 1870; Dovedale, 1881-1886, *Ley*; limestone rocks, Castleton and Ashwood Dale, *Whitehead.*

137. ***Philonotis fontana*** L.

I. (*Bartramia fontana* Brid. Edale Head, 1881, *Ley*). Charlesworth Coombs and Kinder Scout; Castleton; Fernilee, near Buxton, *Whitehead.*

138. ***Philonotis calcarea*** B.&S.

I. (*Bartramia calcarea* B.&S. Monk's Dale, 1881, *Ley*). Kinder Scout and Chee Dale, male plants only, *Whitehead.*

139. ***Breutelia arcuata*** Dicks.

I. (*Bartramia arcuata* Brid. Raven's Dale, 1881, *Ley*). Chee Dale and Kinder Scout, *Whitehead.*

BRYACEÆ.

140. ***Leptobryum pyriforme*** L.

I. Shady limestone rocks, Castleton, *Whitehead.*

III. Newton Solney, *Hagger*; stonework, Mickleover, *Bindley.*

141. ***Webera cucullata*** Schp. Not in Lond. Cat.

I. Kinder Scout, *Whitehead.*

142. ***Webera nutans*** Schreb.

I. Not uncommon on the Millstone Grit and Coal Measures, *Whitehead.*

III. Repton Rocks, *Hagger.*

143. ***Webera cruda*** Schreb.

(*Bryum crudum* Schreb. Near Hollinsclough, fruit, 1881; Raven's Dale, 1881, *Ley*). Miller's Dale, *Holt*; Castleton, *Whitehead.*

144. ***Webera annotina*** Hedw.

I. Kinder, near Hayfield; Charlesworth, *Whitehead.*

III. Tickenhall, *Hagger.*

VAR. ***angustifolia*** Schpr.

I. Castleton, *West* in Whitehead.

145. ***Webera carnea*** L.

I. Clay banks at Charlesworth, *Whitehead.*

III. Damp railway bank, Mickleover, *Bindley.*

146. ***Webera albicans*** Wahl.

I. (*Bryum albicans* Wahl. Fruiting at Dale End, near Alstonefield, 1879, *Ley*). Banks at Castleton; Stenior Clough; Stirrup Wood, Charlesworth; and Kinder Scout, *Whitehead.*

147. ***Zieria julacea*** Schpr.

I. (*Bryum Zierii* Dicks. Cave Dale, Castleton, 1881; Raven's Dale, 1881, *Ley*). Cressbrook Dale, *Holt*; Cave Dale, Castleton, *West* in Whitehead.

148. ***Bryum pendulum*** Hornsch.

I. Wall near Chapel-en-le-Frith, *Whitehead.*

III. Foremark and Repton Rocks, *Repton F. & F.*

149. ***Bryum inclinatum*** Swartz.

I. Wall in Miller's Dale, *Whitehead*; Cromford!

150. ***Bryum intermedium*** W.&M.

I. Walls, Miller's Dale and Charlesworth, *Whitehead.*

III. Newton Solney, *Hagger.*

151. ***Bryum bimum*** Schreb.

III. Boggy place, Findern, *Bindley.*

VAR. ***cuspidatum*** Bry. Eur.

I. (*Bryum affine* Bruch). Buxton, *Hunt*, 1871, in Whitehead.

152. ***Bryum pallescens*** Schleich.

I. Monsal Dale, *Holt*, 1879, in Whitehead.

153. ***Bryum murale*** Wils.

I. Wall top at Cressbrook Mills, 1877, teste H. Boswell, *Ley.*

154. ***Bryum atropurpureum*** W.&M.

I. Ashwood Dale, *Whitehead.*

III. Willington, *Hagger.*

VAR. ***gracilentum*** Tayl.

I. Near Castleton, *West* in Whitehead.

155. ***Bryum cæspiticium*** L.

I. Walls near Tideswell and Bakewell, *Whitehead.*

III. Ingleby, *Hagger*; Mickleover, *Bindley*; common about Derby!

156. ***Bryum argenteum*** L.

I. Common, *Whitehead*; Matlock Bath!

III. Willington and Repton, *Hagger*; Mickleover, *Bindley.*

157. ***Bryum capillare*** L.

I. Frequent on walls, *Whitehead.*

III. Knowle Hills and Repton, *Hagger*; Mickleover, *Bindley*; Quarndon and Duffield.

VAR. ***macrocarpum*** Hueben.

I. Wall at Castleton, *Whitehead.*

VAR. ***Ferchelii*** B.&S.

I. Buxton, *Prof. Barker* in Whitehead; Litton Dale, *Whitehead.*

158. ***Bryum pallens*** Swartz.

I. Via Gellia, Matlock, 1887, *Ley*; Ashwood, Miller's and Monsal Dales; Chapel-en-le-Frith and Matlock, *Whitehead.*

III. Willington, *Hagger.*

159. ***Bryum pseudo-triquetrum*** Hedw.

I. Monk's Dale, 1881, *Ley*; wet bank near Castleton; nr. Woodhead, male pl.; Charlesworth, *Whitehead.*

160. ***Bryum roseum*** Schreb.

I. Cressbrook, *Holt*; Stirrup Wood, Charlesworth; Castleton; Chee Dale, *Whitehead.*

161. ***Bryum filiforme*** Dicks.

I. Edale, *Holt* in Whitehead.

MNIACEÆ.

162. ***Mnium cuspidatum*** Hedw.

I. Chee Dale and Matlock, *Whitehead.*

III. Anchor Church, *Hagger.*

163. ***Mnium affine*** Bland.

I. Monsal Dale and Matlock, *Whitehead.*

VAR. ***rugicum*** Laur.

I. Monsal Dale, *Holt* in Whitehead.

164. ***Mnium undulatum*** Hedw.

I. Common. Ashwood and Monsal Dales; Matlock, *Whitehead.*

III. Bretby, *Hagger*; Mickleover, *Bindley.*

165. ***Mnium rostratrum*** Schrad.

I. Stirrup Wood and Whitebottom Wood, Charlesworth; Lover's Leap, Ashwood Dale, *Whitehead.*

III. Foremark, *Hagger.*

166. ***Mnium hornum*** L.

I. Frequent in fruit, *Whitehead*; Lea Wood, Cromford!

III. Foremark, *Hagger*; Dale Woods, *Bindley*; Ockbrook!

167. ***Mnium serratum*** Schrad.

I. Fernilee Wood, near Buxton, *Gordon*; Matlock, *Whitehead.*

168. ***Mnium stellare*** Hedw.

I. Raven's Dale, 1881, *Ley*; Odin Mine, Castleton, fr., 1884, *Holt*; Ashwood and Taddington Dales; Edale, etc., *Whitehead.*

169. ***Mnium punctatum*** Hedw.

I. Rather common in woods and shady places, *Whitehead*; Death o' Lumb, near Belper!

III. Knowle Hills, *Hagger*; Dale Wood and Mickleover, *Bindley.*

170. ***Mnium subglobosum*** B.&S.

I. Carmeadow, near Hayfield, 1882, *Holt*; Kinder Scout and Charlesworth Coombs, *Whitehead.*

171. ***Aulacomnium androgynum*** L.

I. Plare Wood, Youlgreave, 1877, *Ley.*

III. Mickleover, *Bindley.*

172. ***Aulacomnium palustre*** L.

I. Whatford Wood, Buxton, 1874, *Ley*; Charlesworth Coombs; Kinder Scout; Coombs Moss, *Whitehead.*

III. Repton Rocks, *Repton F. & F.*

TETRAPHIDACEÆ.

173. ***Tetraphis pellucida*** L.

I. Near Rowsley, 1880, *Ley.* Rather frequent. Stirrup Wood, Charlesworth, and Whitebottom Wood, fr., *Whitehead.*

III. Repton Rocks, *Repton F. & F.*

174. ***Tetradontium Brownianum*** Dicks.

I. Wooded Gritstone rocks, between Rowsley and Stanton, 1880, *Ley*; Kinder Scout, *Holt* in Whitehead.

POLYTRICHACEÆ.

175. ***Oligotrichum hercynicum*** Ehrh.

I. Near Goyt's Bridge, 1874; Brown Head, near Chapel-en-le-Frith, 1881, *Ley*; Kinder Scout and Edale, *Whitehead.*

176. ***Atrichum undulatum*** L.

I. Common in woods and shady banks, *Whitehead.*

III. Foremark, *Hagger*; Mickleover, *Bindley*.

177. ***Pogonatum nanum*** Neck.

I. Clay bank at Charlesworth, *Clough* in Whitehead.

III. Repton, *Hagger*.

178. ***Pogonatum aloides*** Hedw.

I. Near Buxton, very common, 1869, 1874, *Ley*; rather frequent on clay banks, *Whitehead*.

III. Repton Rocks, *Hagger*.

179. ***Pogonatum urnigerum*** L.

I. Charlesworth Coombs; Kinder Scout; Chapel-en-le-Frith; Buxton; and near Whaley Bridge, *Whitehead*.

III. Repton Rocks, *Hagger*.

180. ***Pogonatum alpinum*** L.

I. Kinder Scout, *Clough* in Whitehead.

181. ***Polytrichum gracile*** Menz.

I. Stirrup Wood, Charlesworth; Ernicroft Wood, Mellor, *Whitehead*.

182. ***Polytrichum formosum*** Hedw.

I. Monsal Dale, *Whitehead*.

III. Foremark, *Hagger*.

183. ***Polytrichum piliferum*** Schreb.

I. Whatford Wood, Buxton, etc., 1869, 1870, *Ley*; Charlesworth Coombs; Raworth; Kinder Scout; Stenior Clough, *Whitehead*.

III. Repton Rocks, *Hagger*.

184. ***Polytrichum juniperinum*** Willd.

I. Charlesworth Coombs, *Schofield* in Whitehead.

III. Tickenhall, *Hagger*; Findern, *Bindley*.

185. ***Polytrichum strictum*** Banks.

I. Kinder Scout, *Holt* in Whitehead.

186. ***Polytrichum commune*** L.

I. Abundant on the moorlands, *Whitehead*; Cromford!

III. Repton Rocks, *Hagger*.

187. ***Diphyscium foliosum*** L.

I. Goyt's Lane, near Buxton, 1881, *Ley*.

Section II.—AMPHOCARPI.

FISSIDENTACEÆ.

188. ***Fissidens bryoides*** Hedw.

I. Grin Wood, Buxton, 1870, *Ley*; Stirrup and Whitebottom Woods, etc., *Whitehead.*

III. Repton, *Hagger*; Mickleover, *Bindley*; Quarndon!

189. ***Fissidens exilis*** Hedw.

I. Clay banks, Charlesworth, *Whitehead.*

III. Mickleover, *Bindley.*

190. ***Fissidens incurvus*** W.&M.

I. Clay banks, Charlesworth, and near Whaley Bridge, *Whitehead.*

191. ***Fissidens viridulus*** Wils.

I. Monk's Dale, 1887, *Ley*; banks at Mellor, *Schofield* in Whitehead.

192. ***Fissidens pusillus*** Wils.

I. Lover's Leap, Buxton, *Hunt*; Chee Dale; Monk's Dale, *Barker* in Whitehead.

Var. ***madidus*** Spruce. (*Fissidens minutulus* Sull.).

I. Stirrup Wood, Charlesworth, *Gordon, Nield, Ashton,* and *Tetlow* in Whitehead.

193. ***Fissidens crassipes*** Wils.

I. Via Gellia, Matlock, 1887, *Ley*; Monsal Dale and Raven's Dale, *Holt* in Whitehead.

194. ***Fissidens osmundoides*** Hedw.

I. Edale Head, 1881, *Ley*; abundantly in fruit at Kinder Scout, *Whitehead.*

195. ***Fissidens decipiens*** DeNot.

I. Buxton; Deep Dale; Raven's Dale; Lathkill Dale, 1869-1886, *Ley*; frequent in Ashwood and Miller's Dale and Stenior Clough, *Whitehead.*

196. ***Fissidens adiantoides*** Hedw.

I. Stirrup Wood, Charlesworth; Kinder Scout; Fernilee, near Buxton, *Whitehead.*

197. ***Fissidens taxifolius*** L.

I. Clay banks, Charlesworth, and near Whaley Bridge, *Whitehead.*

III. Milton, *Hagger*; Mickleover, *Bindley.*

SCHISTOSTEGACEÆ.

198. ***Schistostega osmundacea*** Dicks.

I. Rocks near Stanton, 1880, *Ley*; Cratcliff Tor, near Youlgreave, *Pullinger*; shady rocks, Charlesworth Coombs; and in an old coal drift near New Mills, *Whitehead.*

III. Repton Rocks, *Hagger.*

Section III.—CLADOCARPI.

RIPARIACEÆ.

199. ***Cinclidotus fontinaloides*** Hedw.

I. On stones in the Wye at Chee Dale and Miller's Dale, and in the river at Dovedale, *Whitehead.*

200. ***Fontinalis antipyretica*** L.

I. Not uncommon in the streams on the limestone, such as the Wye, Dove, and Lathkill rivers, *Whitehead.*

III. Ponds, Mickleover, *Bindley.*

Var. ***gigantea*** Schpr.

I. Miller's Dale, *Holt* in Whitehead.

Var. ***gracilis*** Lindb.

I. Carmeadow, near Hayfield, *Holt*; Charlesworth Coombs, *Whitehead.*

201. ***Fontinalis squamosa*** L.

I. Edale Head, 1881, *Ley*; in the Goyt, near Fernilee, fr., *Clough*; Kinder Scout, *Whitehead.*

CRYPHÆACEÆ.

202. ***Hedwigia ciliata*** Dicks.

I. Kinder Scout; Fernilee, near Buxton, *Whitehead.*

Section IV.—PLEUROCARPI.

LEUCODONTACEÆ.

203. ***Leucodon sciuroides*** L.

I. Limestone wall, Hartington, in Dovedale; with abortive setæ, near Matlock and Bakewell, *Wilson* in Whitehead.

III. Tree, Mickleover, *Bindley.*

NECKERACEÆ.

204. ***Neckera pumila*** Hedw.

I. Derbyshire, *Wilson* in Whitehead.

205. ***Neckera crispa*** L.

I. Abundant on the limestone, Buxton, Dovedale, etc., *Ley*; on rocks in the limestone dales, mostly Chee Dale, *Whitehead*; Dovedale and Matlock Bath, *Bindley*.

VAR. ***falcata*** Boulay.

I. Castleton, *Whitehead.*

206. ***Neckera complanata*** L.

I. Rare on the Coal Measures; common on walls in the limestone dales. Monsal Dale, fr., *Holt* in Whitehead; on a tree, Matlock Bath, *Bindley.*

III. Shobnal, *Repton F. & F.*

207. ***Homalia trichomanoides*** Schreb.

I. Fernilee, near Buxton; Matlock Bath, *Whitehead.*

III. Mickleover, *Bindley.*

HOOKERIACEÆ.

208. ***Pterygophyllum lucens*** Sm.

I. (*Hookera lucens* Sm. Fruiting in Wildmoor Clough, Buxton, 1870, *Ley*). Stirrup Wood; woods at Mellor; Fernilee, near Buxton; Lover's Leap; Kinder Scout, *Whitehead.*

III. Repton Rocks, *Repton F. & F.*

LESKEACEÆ.

209. ***Leskea polycarpa*** Ehrh.

I. On stones by the Wye, Chee Dale; on tree by the Wye, Miller's Dale, Cressbrook Dale, and Monsal Dale; by the Derwent in Chatsworth Park, *Whitehead*; Dovedale, *Bindley.*

III. Tree by water, Anchor Church, Mickleover, *Bindley.*

210. ***Anomodon viticulosus*** L.

I. Abundant on the limestone, Buxton; Dovedale, *Ley*; Miller's Dale, fr., *Whitehead.*

7th Sept. 1899.

211. ***Heterocladium heteropterum*** Bruch.

I. Wet rocks, Stirrup Wood, Charlesworth, Mellor, and Kinder Scout, *Whitehead.*

212. ***Thuidium tamariscinum*** Hedw.

I. Not uncommon, Fernilee and Chee Dale, fr., *Whitehead.*

III. Bretby, *Hagger*; Mickleover, *Bindley*; Quarndon and Duffield!

213. ***Thuidium recognitum*** Hedw.

I. Romantic Rocks at Matlock Bath, 1790; and again in 1820 with perfect fruit, *Sir J. E. Smith* (Herb. Smith); *Wilson's* Bryologia. In the above place in 1884, *Whitehead*; Monsal Dale, *Holt* in Whitehead; Dovedale, *Bindley*; Miller's Dale, *Hagger.*

HYPNACEÆ

214. ***Cylindrothecium concinnum*** DeNot.

III. Tickenhall, *Hagger.*

215. ***Thamnium alopecurum*** L.

I. Dirnin Dale, near Ashford, 1869, *Ley*; wet rocks at Charlesworth and Mellor; rather plentiful on wet rocks in the limestone dales, but the fruit is rather rarely produced, *Whitehead*; Dovedale, *Bindley.*

216. ***Thamnium angustifolium*** Holt, Jour. of Bot., 1886; not in Lond. Cat.

I. Wet rocks, Raven's Dale, *Holt* in Whitehead. The only British habitat.

217. ***Climacium dendroides*** L.

I. Buxton, 1869, *Ley*; marshy meadow, Charlesworth, with abundance of fruit, *Scholefield*; Matlock Bath; Caves Dale, Castleton, and Kinder Scout, *Whitehead.*

III. Repton Rocks, *Repton F. & F.*

218. ***Pylaisia polyantha*** Schreb.

I. On trees, Matlock Bath, *Whitehead.*

219. ***Isothecium myurum*** Poll.

I. Stanton, 1886, *Ley*; on trees, Fernilee, near Buxton, Lathkill Dale, *Whitehead.*

III. Burton Road, Repton, *Repton F. & F.*

220. ***Orthothecium intricatum*** Hartm.

I. Deep Dale, Buxton; Lathkill Dale, 1886, *Ley*; Chapel-en-le-Frith, *Barrat*; Castleton, *West*; Chee Dale, *Whitehead.*

221. ***Homalothecium sericeum*** L.

I. Rare on the Coal Measures; plentiful on limestone walls and rocks, *Whitehead*; Rowsley, *Hagger.*

III. Common; Mickleover, *Bindley.*

222. ***Camptothecium lutescens*** Huds.

I. Rather frequent on limestone rocks and walls; Ashwood Dale, fr., *Schofield*; near Wormhill, *Whitehead.*

III. Wood, near Repton Rocks, *Hagger.*

223. ***Scleropodium cæspitosum*** Wils.

I. Shady places on limestone; Lathkill Dale, 1886, *Ley*; Cressbrook Dale, *Holt*; Miller's Dale, *Whitehead.*

224. ***Brachythecium glareosum*** B.&S.

I. On banks, Ashwood Dale and Fernilee, near Buxton; Over Haddon; Chapel-en-le-Frith, *Whitehead.*

225. ***Brachythecium velutinum*** L.

I. Raven's Dale, 1881, *Ley*; frequent, Mellor; Whaley Bridge; Miller's Dale, and Ashwood Dale, *Whitehead.*

III. Mickleover, *Bindley*; Quarndon!

226. ***Brachythecium rutabulum*** L.

I. Rather common throughout the district, *Whitehead*; Matlock Bath!

III. Tickenhall and Repton, *Hagger*; Mickleover, *Bindley*; Gunn's Hills; Mackworth; Ireton and Ockbrook!

227. ***Brachythecium rivulare*** B.&S.

I. Wet rocks, Kinder Scout and Castleton, *Whitehead.*

III. Ireton!

228. ***Brachythecium populeum*** Hedw.

I. Raven's Dale, 1881, *Ley*; Whitebottom Wood, Charlesworth; Mellor; Fernilee, near Buxton, *Whitehead.*

III. Knowle Hills, *Hagger*; Breadsall Moor!

229. ***Brachythecium plumosum*** Swartz.

I. Stirrup Wood, Charlesworth; near Glossop; Kinder, near Hayfield, *Whitehead.*

230. ***Eurhynchium myosuroides*** L.

I. Wood at Fernilee, near Buxton; Whitebottom Wood, Charlesworth; Edale, *Whitehead*; Dovedale, *Bindley.*

III. Repton, *Hagger.*

231. ***Eurhynchium circinatum*** Brid.

I. Lathkill Dale, 1886, *Ley.*

232. ***Eurhynchium striatulum*** Spruce.

I. Wormhill, *West* in Whitehead.

233. ***Eurhynchium striatum*** Schreb.

I. Stirrup Wood, Charlesworth; hedge bank, Mellor; and near Whaley Bridge, *Whitehead.*

II. Common, Scarcliffe, 1870, *Ley.*

III. Duffield!

234. ***Eurhynchium crassinervium*** Tayl.

I. Dovedale, 1877; Rowsley, 1880; Lathkill Dale, fr., 1876, *Ley*; Matlock, *Wilson*; by the Wye in Chee Dale and Miller's Dale; limestone rocks, Castleton, *Whitehead.*

235. ***Eurhynchium piliferum*** Schreb.

I. Whitebottom Wood, Charlesworth; Fernilee, near Buxton; Cressbrook Dale, Over Haddon and Castleton, *Whitehead.*

236. ***Eurhynchium Swartzii*** Turn.

I. Raven's Dale, 1881; Lover's Leap, Buxton, 1886, *Ley*; Stirrup and Whitebottom Woods, Charlesworth; Dell at Mellor, and Castleton, *Whitehead.*

III. Bretby, *Hagger*; Mickleover, *Bindley.*

237. ***Eurhynchium prælongum*** Dill.

I. Frequent in woods on the Coal Measures, Whitebottom Wood and Whaley Bridge, fr., *Whitehead.*

III. Near Bretby, *Hagger*; Mickleover, *Bindley*; Little Eaton!

238. ***Eurhynchium pumilum*** Wils.

I. Cressbrook, *Holt*; Wormhill, *West*; Stirrup Wood, Charlesworth, *Whitehead*.

239. ***Eurhynchium Teesdalii*** Sm.

I. (*Rhynchostegium Teesdalii* Sm. Mill wheel, Cromford, 1887, *Ley*.) Chee Dale and Miller's Dale, *Holt* in Whitehead.

240. ***Hyocomium flagellare*** Dicks.

I. On rocks by streams, Kinder Scout, Charlesworth Coombs, and Stenior Clough, *J. W.* in Whitehead.

241. ***Rhynchostegium tenellum*** Dicks.

I. Raven's Dale, 1881, *Ley*; shady wall at Mellor; shady rocks in the limestone dales, *Whitehead*.

242. ***Rhynchostegium depressum*** Bruch.

I. Raven's Dale, 1881; Lathkill Dale, 1886, *Ley*; Cressbrook, *Holt*; Matlock Bath and Chee Dale, *Whitehead*.

243. ***Rhynchostegium confertum*** Dicks.

I. Frequent on walls through the district, *Whitehead*.

III. Mickleover, *Bindley*.

244. ***Rhynchostegium murale*** Hedw.

I. Very abundant on the limestone near Buxton, *Ley*; on walls and rocks in the limestone dales; a form near the var. *julaceum* Schpr. occurs near Whaley Bridge and Buxton, *Whitehead*; Matlock, *Hagger*.

III. Mickleover, *Bindley*.

VAR. ***julaceum*** Schpr. (Teste H. Boswell.)

I. On the Lathkill near Youlgreave, 1877, teste H. Boswell, *Ley*.

245. ***Rhynchostegium ruscifolium*** Neck.

I. On stones in streams near Whaley Bridge; Stirrup Wood, Charlesworth; and Mellor, *Whitehead*.

III. Foremark, *Hagger*; Mickleover, *Bindley*.

246. ***Plagiothecium latebricola*** Wils.

I. Charlesworth Coombs, *Whitehead*; Dovedale, *Bindley*.

247. ***Plagiothecium pulchellum*** Hedw.

I. Miller's Dale, *Holt* in Whitehead.

248. ***Plagiothecium denticulatum*** L.

I. Stirrup Wood, Charlesworth, *Whitehead.*

III. Repton; near Eggington, *Hagger*; Mickleover, *Bindley*; Dale Woods!

VAR. ***sulcatum*** Spruce.

I. Castleton and Miller's Dale, *Whitehead.*

249. ***Plagiothecium Borrerianum*** Spruce.

I. (*P. elegans* Hook. Edale, 1870; Stanton, 1886; Whatford Wood, Buxton, 1874, *Ley*). Common in woods at Charlesworth and other places on the Coal Measures; Ernicroft Wood, Mellor, *Vield* and *Ashton*, c.fr. in Whitehead.

250. ***Plagiothecium sylvaticum*** L.

I. Wood at Mellor, *Whitehead.*

III. Dale Woods!

251. ***Plagiothecium undulatum*** L.

I. Whatford Wood, Buxton, 1869; Stanton, 1886, *Ley*; common in the hilly districts; Fernilee Wood, near Buxton, fr.; Ernicroft Wood, Buxton, *Whitehead*; Dovedale and Matlock Bath, *Bindley*; Lea Hill, Cromford!

III. Wood near Repton Rocks, *Hagger.*

252. ***Amblystegium confervoides*** Brid.!

I. (*Hypnum confervoides* Brid. Raven's Dale, 1881, teste Rev. C. H. Binstead, *Ley*). Cressbrook Dale, *Holt* in Whitehead; Dovedale, *Dr. Fraser*, Braithwaite.

253. ***Amblystegium serpens*** L.

I. Common, *Whitehead.*

III. Mickleover, *Bindley*; Gunn's Hills, Mackworth and Ockbrook!

254. ***Amblystegium radicale*** P. Beauv.

I. Milton Reservoir, Chapel-en-le-Frith, *Barker* in Whitehead.

255. ***Amblystegium irriguum*** Wils.

I. (*H. irriguum* Wils. In the Wye, Blackwell, 1870; and in the Dove, Dovedale, 1887, *Ley*). By a rivulet and by the Goyt at Mellor, *Holt* in Whitehead; Matlock Bath!

256. ***Amblystegium fluviatile*** Swartz.

I. (*H. fluviatile* Swartz. In the Wye, Miller's Dale, 1881; in the Dove, Dovedale, 1887, *Ley*). By the Wye, Chee Dale; by the Derwent, Matlock Bath, *Whitehead.*

257. ***Amblystegium riparium*** L.

I. Whaley Bridge and Chapel-en-le-Frith, *Barker*; Mellor, *Whitehead*; Dovedale, *Bindley.*

III. Mickleover, *Bindley.*

258. ***Hypnum aduncum*** Hedw.

I. Miller's Dale, *Hagger.*

259. ***Hypnum exannulatum*** Gümb.

I. Bogs on Kinder Scout and Charlesworth Coombs, *Whitehead.*

260. ***Hypnum vernicosum*** Lindb.

I. Kinder Scout, *Holt* in Whitehead.

261. ***Hypnum Cossoni*** Schpr.

I. Kinder Scout, *Holt* in Whitehead.

262. ***Hypnum Sendtneri*** Schpr.

I. Kinder Scout, *Holt* in Whitehead.

263. ***Hypnum revolvens*** Swartz.

I. Whatford Wood, Buxton, 1874, *Ley*; Kinder Scout, *Whitehead.*

264. ***Hypnum fluitans*** L.

I. Kinder Scout, Edale, and Axe Edge, *Whitehead.*

VAR. ***submersum.***

Brownhead, Chapel-en-le-Frith, 1881, teste Rev. C. H. Binstead, *Ley.*

265. ***Hypnum uncinatum*** Hedw.

I. Ashwood Dale, Castleton, Charlesworth Coombs, and Stirrup Wood, Charlesworth, *Whitehead.*

266. ***Hypnum filicinum*** L.

I. Not uncommon on the limestone, as at Castleton and Tideswell, *Whitehead*; Miller's Dale, *Hagger.*

III. Mickleover, *Bindley.*

VAR. ***vallisclausæ*** Brid.

I. Miller's Dale, *Holt* in Whitehead.

267. ***Hypnum commutatum*** Hedw.

I. Buxton, 1869; Monk's Dale, 1881, *Ley*; frequent, Kinder Scout; Whitebottom Wood, Charlesworth, *Whitehead.*

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268. ***Hypnum virescens*** Boulay.

I. Monsal Dale, *Holt* in Whitehead.

269. ***Hypnum falcatum*** Brid.

I. Buxton, 1869, teste Rev. C. H. Binstead, *Ley*; Ashwood and Monsal Dales, *Barker*; bog on Kinder Scout, *Whitehead.*

270. ***Hypnum rugosum*** Ehrh.

I. Dovedale; Tideswell Dale; Raven's Dale, 1881, very luxuriant, *Ley*; rather frequent amongst limestone rubble; Chee Dale; Miller's Dale and Dovedale, *Whitehead.*

271. ***Hypnum incurvatum*** Brid.

I. Monk's Dale, *Barker*; Duke's Drive, Buxton, *Whitehead.*

272. ***Hypnum cupressiforme*** L.

I. Frequent on rocks and walls; on a tree, Stirrup Wood, Charlesworth, *Whitehead.*

III. Repton, *Hagger*; Mickleover, *Bindley.*

VAR. ***tectorum*** Schpr.

I. Ashwood, Chee, and Miller's Dales; Cressbrook, *Whitehead.*

VAR. ***ericetorum*** Bry. Eur.

I. Among heather, Charlesworth Coombs, *Whitehead.*

273. ***Hypnum resupinatum*** Wils.

I. Dovedale, 1869, *Ley*; Carmeadow, near Hayfield, *Holt*; near Whaley Bridge, *Whitehead.*

274. ***Hypnum patientiæ*** Lindb.

I. Near Stirrup Wood, Charlesworth; Chelmorton, *Whitehead.*

275. ***Hypnum molluscum*** Hedw.

I. Very common; Ashwood Dale, 1869; Raven's Dale, 1881, *Ley*; rather rare on the Millstone Grit; abundant on limestone, *Whitehead*; Buxton, *West*; Miller's Dale, *Hagger.*

III. Mickleover, *Bindley.*

VAR. ***condensatum*** Schpr.

I. Kinder Scout, *Holt* in Whitehead.

276. ***Hypnum palustre*** L.

I. Chapel-en-le-Frith; Fernilee, near Buxton; Castleton; Miller's Dale and Mellor, *Whitehead.*

277. ***Hypnum ochraceum*** Turn.

I. Hayfield, fr., *Holt*; Kinder Scout, Stirrup Wood, and Charlesworth Coombs, *Whitehead.*

278. ***Hypnum polymorphum*** Hedw. (*Sommerfelti* Myr.)

I. Ravensdale, 1881, *Ley*; wall near Ashford, *Ashton* and *Nield* in Whitehead.

279. ***Hypnum chrysophyllum*** Brid.

I. Miller's Dale; Lathkill Dale and Castleton, *Whitehead.*

280. ***Hypnum stellatum*** Schreb.

I. Monk's Dale, *Ley*; frequent on limestone rocks and walls; rather rare on the coal measures, *Whitehead.*

VAR. ***protensum*** Brid.

Miller's Dale, *Holt* in Whitehead.

281. ***Hypnum cordifolium*** Hedw.

III. Old brickfield, Breadsall Moor!

282. ***Hypnum cuspidatum*** L.

I. Buxton, fr., 1870, *Ley*; common in marshy places, *Whitehead.*

III. Willington, *Hagger*; Mickleover, *Bindley*; Little Eaton; Mackworth and Ockbrook!

283. ***Hypnum Schreberi*** Ehrh.

I. Buxton, 1870, *Ley*; Charlesworth Coombs; Kinder Scout and Chee Dale, *Whitehead*; Whatstandwell, *Bindley.* Lea Hill!

III. Tickenhall Lime Quarry, *Hagger*; Quarndon!

284. ***Hypnum purum*** L.

I. Rather frequent, *Whitehead.*

III. Milton, *Hagger*; Mickleover, *Bindley.*

285. ***Hypnum stramineum*** Dicks.

I. Charlesworth Coombs and Kinder Scout, *Whitehead.*

286. ***Hypnum scorpioides*** L.

I. Fairbage Moor, near Glossop, *Whitehead.*

287. ***Hylocomium splendens*** Dill.

I. Rather plentiful on banks in the limestone dales, *Whitehead*; Whatstandwell, *Bindley.*

III. Tickenhall, *Hagger.*

288. ***Hylocomium brevirostrum*** Ehrh.

I. Charlesworth Coombs; Chee Dale, fr., *Whitehead.*

289. ***Hylocomium squarrosum*** L.

I. (*Hypnum.* Pig Tor, Buxton, fr., 1870, *Ley*). Common; Fairbage Moor, near Glossop; Miller's Dale and Charlesworth Coombs, fr., *Whitehead.*

III. Repton, *Hagger*; Mickleover, *Bindley*; Little Eaton!

VAR. ***calvescens*** Wils.

I. Near Whaley Bridge and Mellor, *Whitehead.*

290. ***Hylocomium loreum*** L.

I. Charlesworth Coombs and Kinder Scout; wood near Whaley Bridge, fr., *Whitehead.*

291. ***Hylocomium triquetrum*** L.

I. Rather frequent in the limestone dales, *Whitehead*; Dovedale, *Bindley.*

III. Repton, *Hagger.*

ADDENDA.

In Bibliography add—

Science Gossip, 1873, p. 71, 113, 213.

Add ***Rosa obtusifolia*** Desv.

VAR. ***tomentella*** (Leman).

Repton!

Rosa glauca Vill.

VAR. ***inflexa*** (Gren.).

Repton!

CORRIGENDA.

Rubus saxicolus P. J. Muell.

This is now considered by the Rev. W. Moyle Rogers to be ***Rubus Bloxamianus*** (Colem).

Rosa sepium Thuill. Supp.

This is an error.

381. For *Myriophyllum spicatum* L., p. 190 of Sup., read 382 ***Myriophyllum alternifolium*** DC.

382. This entry should be omitted: it is an error.

575. ***Hieracium argenteum*** Fries.

I. Matlock Bath! An error. There has been some confusion here!

BOULDERS NEAR HORNCASTLE.

REV. J. CONWAY WALTER,
Rector of Langton, Horncastle, Lincolnshire.

In the parish of Langton by Horncastle we have at least five large boulders within a distance of some five hundred yards; and several smaller ones. They lie—or rather did lie, for one has been removed to my own garden at the Rectory—along the road which runs through the village. The road is probably a very ancient one, for, like a Devonshire lane, traffic or some other cause has worn it down to a depth of from four to five feet below the level of the land on either side of it. These boulders are found, one (a) tilted up, doubtless artificially, against the bank slightly above the road level; another (b) on the road level; a third (c) about a foot below the road, in the bank of the ditch; and a fourth (d) is low down in a ditch, two feet or more below the road level. The fifth (e), now in my own garden, used to be close to the road-side, within a couple of yards of (a) the one tilted up. It was nearly three hundred yards from my garden; but it, with another one still in situ, had been bought of the parish by my father many years ago; and in the year 1890 I determined, if possible, to transfer it to the Rectory garden. I made a very strongly-constructed sledge, and, with the help of two men, I got it levered on the sledge; and it took five good cart horses to move it, and some chains were broken in the process; for the five horses could only drag it a hundred yards or so at a time, and at each fresh start there was a very severe strain on their gear. Arrived in the garden, with the aid of two more men, five of us in all, we managed to lever it on to a flower bed, and worked it round to form a prominent wing of a rockery, which I had constructed. There it was seen last year by Mr. John Cordeaux, when he paid me a visit from Woodhall Spa, and was pronounced by him to be 'one of the finest boulders in the county.' We had one, however, very much larger in this neighbourhood, in the parish of Edlington, on the farm of Mr. Robert Searby, 'as big as a hay-stack,' but that was destroyed by dynamite some two years ago. The dimensions of the one in my garden are: length about 4 ft. 5 in., height 3 ft. 5 in., and thickness about 2 ft. The one down the village (a) tilted up is less than this, being about 3ft. by 2 ft. 6 in., thickness not known; the one (b) on the road level, also bought by my father, but not yet removed, is about

the same size as my own. The third (c) in the ditch about a foot below road level is partly buried in the bank, and its size cannot be accurately ascertained; but it is thicker than my own, say some 2½ ft., shorter than my own, about 3 ft., but how far it is embedded in the bank we cannot say. Of the remaining boulder (d) which is in the ditch, two feet below road level, only one side is visible, which is between 2 ft. and 3 ft. long, thickness and other dimensions not known. The boulder (c), one foot below road level, is remarkable for having on its surface the matrix of an ammonite, about 10 in. in diameter and 2 in. or so deep. This locally is supposed to be the impression of a horse's hoof, surmised to have been left by the steed of a local St. George fighting his dragon.

Mr. T. Sheppard, of the Hull Scientific and Field Naturalists' Club, visiting me on the 3rd of this month (July 1899) inspected these boulders; we scraped the soil away from the surface of this particular boulder (c), and he agreed that there was no doubt that the impression was that of an ammonite of large size. He chipped fragments from the different boulders, and pronounced them all to be 'Spilsby sandstone (Neocomian).' They are very hard, from the presence of carbonate of lime.

We have many smaller boulders in the parish; and in the adjoining parishes of Woodhall and Thimbleby some large ones.

NOTES—ORNITHOLOGY.

Unusual Nesting-place of a Spotted Flycatcher.—We have at the present time a pair of Flycatchers (*Muscicapa grisola*) bringing up four young ones in a Swallow's nest. The nest is about seven feet from the ground, and is situated under the roof that overhangs the driver's seat of an old van, now used as a dark-room. Swallows have built there for several years; this season they repaired and re-lined one of the two old nests, but were evidently disturbed, as they then forsook the nest, which was later on taken possession of by the Flycatchers, who used the nest just as it was.—S. C. Stow, Court Leys, Brandon, Grantham, 16th August 1899.

Large Number of Eggs of the Blue Titmouse.—I lately saw in a Holderness Vicarage garden (Mappleton, near Hornsea) a nest of this bird (*Parus cæruleus*) in a disused pump, with 14 eggs. The hen was constantly seen during the last month, going to its nest by the hole under the pump handle. When the lid on the top of the pump was occasionally lifted up the bird was seen sitting on six or seven eggs, hissing like a regular Billy-biter. She sat on these eggs, hopefully we trust, for a long time. At length the Vicar took out one or two eggs and found them addled. They had never been fertilised, because no cock bird had been seen for many weeks in the garden, which is a mile from the nearest shrubbery and plantation at Rowlston Hall, where there are generally two or three nests every year. The poor bird continued afterwards laying eggs until there are now as above stated 14 eggs.—B. B. Haworth-Booth, Hullbank Hall, Hull, 10th July 1899.

NOTE—BOTANY.

Hodgson's 'Flora of Cumberland.'—In the June issue of 'The Naturalist,' p. 161, I observe that Mr. A. Bennett has offered a few kindly criticisms on my recently published 'Flora of Cumberland.' Serious illness has prevented me from replying to his strictures until to-day. Mr. Bennett rather complains of omission from the work of species which, in his opinion—for which, by the way, I entertain the highest respect—ought to have found a place. Let me take these plants in the order adopted by my friendly critic as follows:—

Astragalus glycyphyllus. Culgaith Pike, Keswick (Winch, Contributions to the Flora of Cumberland). This is one of Hutchinson's History of Cumberland localities. Shortly after I first commenced to take preparatory notes, about twenty-five years ago, I discovered that Hutchinson's authority as to stations was extremely unreliable, and I therefore declined, for the most part, to accept them, unless supported by modern confirmation. In addition to this, the localities indicated, though divided only by a comma, are in reality thirty miles apart, and this fact added to my mistrust. I may have erred by carrying my doubts a little too far.

Potentilla verna. Bank Wood. Contributed also from Hutchinson. Here, again, uncertainty was accentuated by divergence of the views entertained by more recent and competent authorities. *Bank Woods* there are many in our county, and which is the *right* one I never found out. To Mr. Bennett's concluding sentence I heartily say Amen, and must leave the matter there, as the infirmities incident to old age forbid any further rock climbing on my part.

Statice bahusiensis. 'In Top. Botany, p. 341. Mr. Watson gives it for Cumberland, Heysham sp.' Here the question arises which Heysham is meant, the old doctor, or his son, T. C. Heysham, subsequently Mayor of Carlisle, some of whose notes, written on tiny slips of paper, are in my possession. Where was the specimen referred to gathered? In this connection I happen to know where a collection of plants of the Statice family exists, not gathered in Cumberland, but on the Scotch side of the Solway, in the county of Kirkcudbright, which have not so far been named.

Rumex domesticus. Hutchinson again. Three years ago I found examples of *Rumex maritimus* (Golden Dock) at Maryport, and I found another at the same station a fortnight ago, which I failed to identify to my own satisfaction. It was, perhaps, a little too young. The motto, 'Try again,' must be put in practice.

Goodyera repens. This species will have to be accepted on the high authority of Mr. Lees, though I cannot make out that it has been noted by any of the contributors who have furnished me with local notes from time to time.

Epipactis violacea. 'Cumberland, Bab. MS. Top. Botany, p. 385.' Here is another illustration of *discrepant doctores*, whose difficulties I am little prepared to solve. I have chosen to treat only of the two species mentioned in the volume, inasmuch as, apart from *E. palustris*, all the other helleborines I have noticed, with a solitary exception, may be referred to *E. latifolia*.

Potamogeton Zizii Roth. With regard to this species, I accept with thanks Mr. Bennett's explanation, confirmed as it is by the naming of Mr. Bailey.

Lastrea rigida. My experience with this fern borders on the humorous. After writing, as in the text, and running my eye over the stations mentioned, I found to my surprise that they were all in the adjoining county of Westmorland, but I neglected to run my pen through what I had inadvertently written.

I am sincerely grateful to Mr. Bennett for the pains he has been at in pointing out to me the 'better way.' —Wm. Hodgson, A.L.S., Workington, 21st July 1899.

7th Sept. 1899.

NOTE—FUNGI.

***Mitrophora gigas* at Burwell, Lincolnshire.**—I found last Saturday at Burwell (N. Lincs., Div. 8 S.), in a plantation, one of the Morells. Mr. Robinson, our great authority here. says it is *Mitrophora gigas*.—BENJN. CROW, Louth, 9th May 1899.

NOTE—LEPIDOPTERA.

Hummingbird Hawkmoth near Horncastle. -I have twice within the last few days seen a Hummingbird Hawkmoth (*Macroglossa stellatarum*) in my garden here. I also saw one in the adjoining parish of Thornton, and I hear that two or three have been seen at Woodhall Spa. They were first seen there by myself about fifteen years ago. We have not seen any here, nor have I heard of their being seen in this neighbourhood, for the last six years. I suppose the long spell of abnormally hot weather must have brought them out. –J. CONWAY WALTER, Langton Rectory, Horncastle, 29th August 1899.

NOTE—PROTOZOA.

Food of *Hydra viridis*. -On 3rd June I made an excursion to Swillington, and brought home *Hydra viridis*. I put them into a basin with tap water and the little sediment which was at the bottom of my bottle. The basin was put into my greenhouse, and next morning I put in a few bread crumbs, which were of no use. I then put the green fly Aphis, of the young shoots of the rose trees, and found they soon devoured them. In fact I allowed them to eat all the Aphides I could get. The *Hydra* would thus be very serviceable in a greenhouse it they could live on plants.—EDWIN WHITEHOUSE, 89, Clarendon Road, Leeds, 10th June 1899.

NOTE—ENTOMOLOGY.

South American Insects in England.—The occurrence of insects in the neighbourhood of our important seaports, imported from South America, or any part of the globe from which live sheep and cattle are shipped, to me seems almost a certainty. On a voyage I am just completing from the La Plata to the Thames, I have had the matter forcibly brought to my notice by the quantity of insect life in the Alfalfa, Anglicè Lucerne (*Medicago sativa* L.) which is shipped in Buenos Ayres for cattle food. The Alfalfa hay literally swarmed with life, butterflies, moths, beetles, flies, and other forms of insect life unknown to me. A swallow-tailed butterfly of large dimensions crawled out of the last consignment of fodder that I took up out of the hold just before we entered the Thames, as also did beetles and flies and a small sort of bee. When passing the Isle of Wight the same thing happened on a lovely June morning, with everything to tempt these rare visitors to fly ashore. After I have given up charge of the stock and left the ship, some of this Alfalfa hay will be landed to feed the cattle in the Deptford lairage, and some of these insects must escape and wend their way to fields and pastures new, just as foreign wood-borers are found round the neighbourhood of wood-yards. On my next trip home I shall collect all the insects I can that have survived to reach the English coast, and shall send them to your worthy contributor, the Rev. A. Thornley, of South Leverton, Notts. Perhaps it would be as well to mention here, that birds, snakes, lizards, and thousands of locusts are to be found in the bales of Alfalfa hay at times. These are crushed and dead, of course, in every case, but are found in a wonderful state of preservation from the great compression of the hydraulic press. I conclude that the insect life crawls into the bales after they have left the press and are stocked in the yard ready for exportation. The same kind of foreign arrivals must be taking place at Liverpool and wherever foreign live stock is landed for the British market.—MAX PEACOCK, S.S. Nyassa, River Thames, 3rd June 1899.

In Memoriam.

JOHN CORDEAUX.

By the death of John Cordeaux this journal loses one of its oldest and most valued contributors; Yorkshire and Lincolnshire, a distinguished naturalist; and British ornithology, a leading authority.

He was born in the year 1831 at Foston Rectory, Leicestershire; and was the eldest son of the Rev. John Cordeaux, M.A., rector of Hooton Roberts, Yorkshire. He died in his 69th year at his residence, Great Cotes House, on the 1st August 1899, after a short but painful illness.

As a young man he went to live at Great Cotes, on the Lincolnshire bank of the Humber Estuary, and here he made for half-a-century those interesting and valuable observations on birds and their migratory movements which have not only made his name familiar to all British ornithologists, but also to those of Europe and America. These records were contributed to the pages of the 'Zoologist,' 'Naturalist,' 'Field,' and other natural history publications and Transactions. In the year 1873, Mr. Cordeaux published his 'Birds of the Humber District'—a book teeming with original observations on the birds resident and migratory of the district which he had made so pre-eminently his own. Quite recently—indeed it was his very last published work—he issued 'A List of British Birds belonging to the Humber District,' in which he brought the information relating to this remarkable region down to date, and wherein no less than 322 species are enumerated, with brief particulars of their occurrence.

It is, perhaps, in connection with the interesting phenomenon of the migrations of our British birds that Mr. Cordeaux has come most into prominence. He was practically the founder of that elaborate and exhaustive enquiry which was undertaken by the British Association in 1880, in which year a committee of experts was appointed to investigate the subject of bird migration as observed on the coasts of Great Britain and Ireland. To this end the various light-houses and light-vessels were supplied with schedules on which the various movements and occurrences of birds were recorded by the light-keepers. This work of collecting data (as well as of reporting annually on the results obtained) was carried on for a period of eight years, and the mass of information thus obtained was so vast that much of the material obtained is still under consideration, although the

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main facts derived from the inquiry have been made public. During all this period—now well nigh on to twenty years—Mr. Cordeaux acted as Secretary to the Committee, a post

John Cordeaux
Great Coates House R S O
Lincoln
Eng 8.99

which was no sinecure, especially during the years of the Committee's active existence, 1880-1887; and it is not too much to say that he was the life and soul of the enquiry, while in later

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years he has been the valued adviser of him who undertook to prepare the results of the investigation as a whole.

Mr. Cordeaux had a competent knowledge in several other branches of natural history, especially as regards botany, mammals, and fishes. He filled, with distinction, the important office of President of the Yorkshire Naturalists' Union, and, on its formation in 1890, he was elected to the chief post of honour in the Lincolnshire Naturalists' Union as its first President. He was gifted with a graceful pen and a poetical imagination, and these contributed to make his writing peculiarly attractive.

As a friend and a man it is impossible to speak in terms too high. He possessed a singularly charming personality, and was beloved by all who knew him, while his sterling worth and lofty principles won for him universal esteem.

By his death a wide circle has lost a true and very dear friend, and British natural history an enthusiastic and accomplished devotee. W. Eagle Clarke.

NOTES—ORNITHOLOGY.

Wryneck on the Coast of Holderness.—A female Wryneck (*Iynx torquilla*) was caught by a dog near the cliff at Rowlston on the 11th May. It was in very poor condition. I have never before heard of this species in Holderness. Mr. Darley, the bird stuffer in Hull, told me it was 37 years since he had seen a specimen.—B. B. Haworth-Booth, Hullbank Hall, Hull, 13th May 1899.

Red-legged Partridge in Huddersfield.—I saw last evening a Red-legged or French Partridge (*Caccabis rufa*) which had just been caught in a small field in almost the centre of Huddersfield; it has been turned out again to-day. I think these Partridges must be coming gradually farther north, as I find, on reference to my collection, of having had one given to me on 30th April 1895 which was caught in the centre of Milnsbridge, a small manufacturing town about two miles from here. The plumage of both birds is much dirtier than those met with in Norfolk or Essex.—Johnson Wilkinson, Huddersfield, 5th June 1899.

Nightingales near Horncastle.—One rara avis of these parts is the Nightingale (*Daulias luscinia*). Whether Mr. Hawley is now favoured with visits of this bird I do not know, but the first time I ever heard it in Lincolnshire was as I was walking past Tumby Lawn, very early in the morning, on my way to fish at Dogdyke. This would be before Mr. Hawley lived here, and when Major Smart occupied the house—sometime in the 'fifties.' I had heard the Nightingale before, at Cambridge, and in Sussex, for I was then living at Brighton, and I at once recognised the note. The Nightingale was first heard at Woodhall Spa—three of them in my own garden, when I lived there in 1876. Since then it has been common there every year in the season, from April to June. It has been said that the Nightingale is not heard north of the river Trent, but this is a mistake, as it is a regular visitant in the neighbourhood of Doncaster, and has, within recent years, been reported at Welbeck Wath in Yorkshire. It also bred in Northumberland in 1895. In Lincolnshire it has been heard, within the last two or three years, in the woods at Rigsby and Ailby, near Alford; at Brackenborough, near Louth; and I see that, in 'The Naturalist,' Mr. Cordeaux reports it as being numerous in the Humber district.—J. Conway Walter, Langton Rectory, Horncastle, 18th August 1898.

In Memoriam.

JOHN CORDEAUX, J.P., F.R.G.S., M.B.O.U.

WORTHIER hands than mine will record my good friend's contributions to ornithology; for me it will be sufficient to sketch in rough outline the events of his life, and to attempt to draw a short word picture of the man himself.

John Cordeaux, the eldest son of the Rev. John Cordeaux, M.A., Rector of Hooton Roberts, Yorkshire, was born at Foston Rectory, Leicestershire, on 27th February 1831. At an early age he was sent from home to Liverpool Collegiate School, where he obtained a thoroughly sound education. His vacations were very frequently spent with his maternal grandfather, Christopher Taylor, at Tothill, near Louth. There, or at Gayton-le-Marsh, close by, wandering over 'the clays' or true 'marsh' of the Lincolnshire coast, the love of natural history first began to assert itself, along with a keen desire for sport which such a bird-infested coast fostered. Still quite a young man, Mr. Cordeaux settled as a farmer at Great Cotes, near Grimsby, and resided there up to the time of his death, which occurred on the 1st of August, with the exception some years ago of a short residence at Eaton Hall, near Retford. He was ever a keen sportsman, at one time regularly hunting with the Yarborough hounds, and to the day of his death was an exceedingly fine shot, and yet found time to take an active part in estate management and in local affairs. The youngest daughter of Dr. W. Wilson, of Horton Hall, Cheshire, was wooed and won in 1860; and a widow, with two sons who hold Her Majesty's commissions, are left behind to mourn his loss.

The tastes and inclinations of Mr. Cordeaux were singularly wide; few men have his grasp or range of interests, but those who knew him most intimately will never think of him only as ornithologist, zoologist, entomologist, botanist, geologist, anthropologist, antiquary, or lover of dialect and folk-lore; all-round student of nature and mankind, he was still something more; the man himself overshadowed his interests and his works. If this is rarely true of the majority of us, it was certainly the case with the first President of the Lincolnshire Naturalists' Union. The 'Migration Reports,' 'Birds of the Humber District,' Anseres in Frohawk's 'Illustrations of British Birds,' or his still later pamphlet on 'The Humber District Ornis,' give no idea of the kind, wide-hearted, sympathetic student, ever ready to lend a willing ear or helping hand to a brother worker in difficulty. Few people knew that the careful recorder and catalogue maker had a pen at command which

could recall the dead past in graphic flashes, and with equal felicity throw off sketches and verse, which his modesty generally kept from the world.

Above the average height, and of upright and good, if fairly full figure, Mr. Cordeaux was a striking man anywhere with his keen face and soldierly bearing. It is reported that when the King of the Belgians nicknamed him 'My Cousin Cambridge,' Mr. Cordeaux was ready at once with the reply, 'Hardly a compliment. Ten years older, and not half so good looking.'

JOHN CORDEAUX. CLAUDE LEATHAM. KENNETH MACLEAN.

Hatfield West Moor, 30th May 1898.

Photograph taken by Mr. R. A. Bellamy, of Doncaster, at a Yorkshire Naturalists' Union Excursion.

The Norfolk shooting dress he always wore in the field might have been designed specially for his use, so well was it adapted to the figure and character of the man and his pursuits. His slightly stooping walk when busily engaged in observing, with hands ever ready to bring his field-glass to his eyes, or to take up anything for gentle, if searching, examination, were quite as characteristic of the man as another pose more difficult to describe. When studying out the solution of some difficult

problem or thoughtfully reflecting, the two first fingers and thumb of his left hand had a way of seeking the upper part of his nose or forehead, as if to aid cogitation.

Never shall I find another such untiring companion for wandering by shore and mud flat, upland common, or tree shaded beck. He was so genial, and yet so full of varied information, as apt in teaching as he was ready to impart, and, withal, as willing and eager to learn himself, as if life were only just unrolling the variegated phantasmagoria of modern knowledge to his gaze. If ever a man's mental characteristic was 'universal inquisitiveness into things which should be generally and fully known,' as he said, it was Mr. Cordeaux's.

'Forty years ago,' he cried, throwing himself back against the sea-bank we were lunching under, a merry twinkle playing in his eyes, 'I was considered a good-natured lunatic by everybody round Cotes, running about with a field-glass and gun to study birds instead of doing what every other young farmer considered "the thing." There were only two other scientific workers known to me in the county then—for the Boggs were rather out of my line. I had not, at that time, taken much interest in geology or botany. The two workers were the Rev. R. P. Alington, of Swinhope, and your kind friend Sir Charles Anderson. Both were good men as far as their opportunities went. Sir Charles told me the last eggs of the Great Bustard ever known in England were taken in '35 or '36 on his father's property at Haywold, near Driffield, on the Yorkshire Wolds. In these days we can form a Naturalists' Union without being laughed at, and the man who has other interests besides the prize ring and racing is not considered an ass.' Then, perhaps, would follow racy tales, with all Mr. Cordeaux's picturesque gift and memory for detail to give them point, now of the parson, who, 'in his sermon, gave the little Syrian Bear all the potentialities of the Grisly, till his mystified congregation were fairly kept awake through the summer afternoon's heat, and worked up into mildly wondering, "How David ever escaped, and what was coming next!" You want to put fire and animation into what you do or say in the pulpit as everywhere else, but there must be something else besides manner. The sparrow that sitteth "alone upon the house top" will give some men occasion to talk undiluted rubbish for half-an-hour, and then they will say nothing whatever—not even where "the sparrow hath found an house," or that human beings "are of more value than many sparrows," or that the Palestinian sparrow is the Blue or Solitary Thrush (*Petrocincla cyanea*), common enough in Southern Europe.' He would end this

discourse on natural history preaching in response to the loud laughter of his audience, with merry, sparkling eyes, and a short, chuckling laugh which was ever infectious. Standing on the same sea-bank later in the year, he pointed out the spots in the famous North Cotes thorn hedge where he had first viewed some of the rarest visitors to our coast, or where his friend, Mr. G. H. Caton-Haigh, had added the Greenish Willow-Warbler and Rodde's Bush-Warbler to the British List.

Walking over what to other people would have been an endless succession of uninteresting fields, he was ever ready with innumerable questions to add to his own store of knowledge or draw out his companion's gift for observation. 'Why does the Bog Rhubarb (*Petasites officinalis*) grow here and nowhere else for miles? Why does it always grow in clumps, rapidly spreading, unless prevented, wherever it is found?' On Aylesby Beck, on another occasion, he was peering through a bush, to get a view over the bank, with all the circumspection of a master in woodcraft, searching the feeding-ground of the Summer Snipe (*Totanus ochropus*) with the fieldglass 'to find out if the young have yet appeared.' Later on he was advancing theory after theory why the nest was never found, though they seemed to 'remain with us all the year round. I have had boys climbing the trees and looking into every old nest and likely place, but it is no good. We cannot spot it—and they must breed here, for I have seen the young.' Later in the day he was pointing out the place where the Grass of Parnassus still grows in all its beauty, but from which the more lovely Marsh Helleborine had departed for ever. 'You have a specimen from this very spot,' he finally added, 'gathered by the Rev. M. G. Watkins and myself. Your problem is, Why has it gone? Now find the true solution; no other will do!' Space fails me to tell half the thronging memories which come crowding on the mind of his observations, happy suggestions, and general mental position of—'Why, would you kindly help me to understand, and explain!'

In reality birds had no greater interest specially for Mr. Cordeaux than many other natural objects and phenomena that surrounded him. The circumstances of his life had given him unusual opportunities for observing them, and he had made the most of his time, and prepared himself for taking full advantage of any chance that offered by studying the literature of ornithology, visiting Heligoland, Norway, and Vadsö, and forming a long and close friendship with Herr Gätke and many other masters. His mind, however, was wider than any one science. Chipped flints, burial mounds, ancient camps, or the forest beds

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with the remains of man, ox, deer, and smaller feral units of geological or prehistoric time, found a diligent student and thoughtful exponent in the ever-watchful master of Great Cotes House. He showed me the maps, drawings, and notes from old records by which he had demonstrated that the lost villages of the Humber shore of the East Riding were long ago buried beneath the waters of the North Sea; Spurn Head being slowly but surely pushed westward into the embouchure of the river, as the Boulder Clay of the east coast of Yorkshire gives way before the action of frost and waves, and is dispersed over the sea floor. His arguments as he explained everything were so concise, clear, and suitable that it seemed as if one were listening to a learned professor of geology demonstrating the action of tidal currents and oceanic scour. Truly did a recent writer in 'The Field' say of him, 'Few country gentlemen have done more than he has done to foster a love of natural history in the county in which he resided, and to add to the common store of knowledge by the patient collection of observed facts and the subsequent publication of them.'

The moral and intellectual atmosphere of that home, where all true workers were made hospitably welcome, and the only self-seeking was a desire for further and fuller knowledge, made it a rallying place for many a jaded worker, and a starting place for fresh efforts and exertions. In this age in which men value one another for what they have rather than for what they are, John Cordeaux stood forth as a sturdy and noble protest.

The characteristic words spoken within two months of his own departure of his friend the late Mr. Hewetson, 'I tell you what it is, I shall soon have to follow him; I miss his friendship and his letters so. When my time comes I should like to be buried on the top of the wolds, where the cry of the Pink-footed Goose can be heard as it flies over in spring or returns in autumn;' or his last message to the members of the Lincolnshire Naturalists' Union, concerning their meeting at Frieston Shore, dictated from his deathbed, 'I cannot possibly come, but I shall be with them in spirit if not in person,' show the true man in all he was. The 'Humber ornithologist' was a man, but the least part of the man was given to the world by his pen —his personality outshone his works. He lies at rest in Louth Cemetery, 'on the top of the wolds,' and no more fitting motto could be found for his tomb than—

He prayeth best who loveth best
All things, both great and small.

E. A. Woodruffe-Peacock.

Naturalist,

LINCOLNSHIRE NATURALISTS AT HARTSHOLME.

Rev. EDWARD ADRIAN WOODRUFFE-PEACOCK, L.Th., F.L.S., F.G.S.,
Vicar of Cadney; Organising and Botanical Secretary, Lincolnshire Naturalists' Union:
Curator of the Lincolnshire County Herbarium.

On the 15th of September, 1898, there was a joint meeting of the Lincolnshire Naturalists' Union and the Lincolnshire Scientific Society at Hartsholme Hall, near Lincoln, the seat of Mr. Nathaniel Clayton-Cockburn, J.P., situate in the parish of Skellingthorpe, in Div. 13. This was the twentieth meeting of the Union for field-work. A lovely summer day made everything pass off very well indeed, under careful supervision of the two presidents, Rev. W. Fowler, M.A., and Dr. G. M. Lowe, M.C. The members of the Societies turned out very well, considering the lateness of the season. Amongst others present were the Revs. A. Thornley, A. Hunt, J. Conway Walter, J. Gurnhill, E. R. Walker, and E. A. Woodruffe-Peacock, Messrs. F. H. Harrison, A. Fieldsend, J. Cordeaux, G. A. Grierson, W. Scorer, W. Lewington, M. Peacock, Musham, Greaves, and Dr. Cassall; also an unusually large number of ladies, amongst whom were the Misses Stowe and Miss Harrison.

The geology of this neighbourhood is not very interesting, except to the specialist in river-drift deposits. The rock, which consists of Lower Lias, is almost wholly covered with the ancient gravels and sands of the river Trent, deposited while it still flowed through the Lincoln Gap, or the much more recent gravels and sands the same river accumulated while passing off some of its flood waters along its old course after its present bed had been finally taken. The pond at Hartsholme is of modern artificial construction, made by deepening the outfall of a natural brook now called the Prial Drain, which formerly emptied into the Catch Water Drain; precisely in the same way as the lake at Boultham, the next parish on the east, has been made by the waters of modernly-named Pike Drain, the Swallow Beck of more ancient days, which has handed on its name to the hamlet close by on its bank.

Of the Duck Pond, Mr. N. Clayton-Cockburn writes:—'As a rule, about October, 300 or 400 Mallard come here to stay till the spring, when they leave the place to nest, I suppose, only a very few remaining here for that purpose. A few Teal and Widgeon come, too. I have never seen any Sheld-duck, but in the spring a few Pochards regularly make their appearance, but do not stay any length of time. A Goosander once arrived

in the spring and stayed for two months, becoming so tame that I hoped it would finally remain. It would allow me to get within twenty yards of it, but it eventually vanished. I should have said that it was an immature bird. In January 1892 a beautiful specimen of the Bittern was picked up from under the ice of the lake at the end of the long frost. Kingfishers are fairly common. We once had a black duck, which I imagined to be a Scoter, here for three seasons. I have never seen wild geese, but in 1892, I think, about Christmas, four Wild Swans settled on the lake, but they soon left. Herons are common, for there is a small Heronry at Doddington, about three miles away. Waterhens are becoming quite a nuisance, but I very rarely see a Coot.'

About 120 species of plants were noted, the four best being *Ranunculus hederaceus*, *Lythrum salicaria*, which is rather local than rare, *Rumex palustris*, and *Scirpus setaceus*.

Five fungi only were seen, reported on by Rev. W. Fowler as follows:—

Amanita rubescens.
Amanita muscaria.
Psalliota arvensis.
Marasmius oreades.
Calocera carnea.

The mosses were just as disappointing, the following being named by Rev. W. Fowler:—

Dicranella heteromalla.
Funaria hygrometrica.
Hylocomium squarrosum.

The following is a list of lepidoptera seen and taken by Mr. W. Lewington and friends:—

Pieris brassicæ.
Pieris rapæ.
Pieris napi.
Pararge megæra.
Polyommatus phlœas.
Triphæna pronuba.
Xanthia flavago.
Thera variata.

They met with the following larvæ:—

Dasychira pudibunda.
Notodonta dictæoides.
Acronycta megacephala.
Hadena oleracea.

We were a little more lucky with our other insect captures. The following is the Rev. A. Thornley's list:—

COLEOPTERA.

Loricera pilicornis.
Philonthus fimetarius.
Stilbus consimilis. Common.
Aphodius contaminatus.
Agelastica halensis.
Cassida nobilis. One example.
Cassida flaveola. One example.
Cassida viridis. One example.
The thorax of this specimen has evidently been 'nibbled' in mistake for a green seed by some larva or other.
Longitarsus suturellus Duft. Common.
Coccinella decempunctata. Common.
Coccinella septempunctata Common.
Adalia bipunctata. Common.
Exochomus quadripustulatus. Common.

Strophosomus coryli.
Xantholinus linearis.
Stenus similis. Common.
Stenus pubescens. One example.
Stenus picipes. One example.

HYMENOPTERA.

Bombus agrorum. A few examples.

The long period of dry weather had made insects rather scarce. By very careful sweeping I added the following :—

COLEOPTERA.

Anaitis ocellata. Two.
Sermyla halensis. Four.
Adalia bipunctata. One var., one type.
Exochomus 4-pustulatus. Six.
Halyzia 14-guttata. Two.
Coccinella 10-punctata. One.
Telephorus lituratus. One.
Malachius bipustulatus. One.
Staphylinus stercorarius. One.

HEMIPTERA.

Acanthosoma dentatum. Two.
Acanthosoma interstinctum. Two.
Scolopostethus decoratus. One.

Our most indefatigable of workers, Mr. J. Eardley Mason, got together the following list :—

HEMIPTERA-HETEROPTERA.

Acanthosoma interstinctum L. One (A. Thornley).
Peritrechus luniger Schill. Twenty-eight.
Drymus sylvaticus Fab. One.
Piesma cupitata Wolff. One.
Gerris gibbifera Schum. Several.
Gerris lacustris L. Several.
Ploiaria vagabunda L. One.
Nabis lativentris Boh. One ♂.
Nabis limbatus Dahlb. One (W. Lewington).
Tetraphleps vittata Fieb. One.

Many Corixæ also from the lakes not yet examined. The extraordinary abundance of *Peritrechus luniger*, which swarmed under bark of an old felled Spruce-fir and in the cracks of the bark of the numerous Willows, was notable; also the absence of Capsidæ, the most numerous family of the order. They feed on the sap, and many plants have species peculiar to themselves alone, but none were taken after diligent search save the first on the list. The rest find their food in other insects.

The Spiders taken on this occasion were not very numerous in species or rare :—

Clubiona brevipes Bl.
Dictyna arundinacea L.
Epeira cornuta C.L.K.
Epeira cucurbitina C.L.K.
Epeira diadematata Bl.
Linyphia triangularis C.L.K.
Meta segmentata C.L.K.
Ocyale mirabilis C.L.K.
Pachygnatha degeerii Sund.
Privata hygrophilus Thor.
Theridion sisyphium C.L.K.
Theridion varians Hahn.
Xysticus cristatus C.L.K.
Zilla atrica Koch.
Zilla x-notata C.L.K.

The two Societies joined at a convivial high-tea at the Saracen's Head Hotel. After the usual reports on the day's work, and fitting speeches from the leading members, the party broke up into chatty groups, comparing notes or reviving old memories of happy days in the field.

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NOTE—MAMMALIA.

***Putorius putorius* near Louth.**—Yesterday I received from Mr. Chowler, of this town, a male Polecat (*Putorius putorius*) in the flesh and quite fresh. He had received it the same day from near Louth. The specimen weighed 21 oz. and was 14 in. in length from nose to root of tail, the tail itself being 7 in. in length.—H. H. CORBETT, 9, Priory Place, Doncaster, 25th April 1899.

NOTE—COLEOPTERA.

***Bembidium schüppeli* in Cumberland.** –On 6th May this year, my friend, Mr. F. H. Day, and I worked the river Irthing below Lanercost for Bembidia. The species taken were *Bembidium punctulatum*, *B. littorale*, *B. atrocæruleum*, *B. tibiale*, and *B. decorum*—all common. Of *B. monticola* we got several, and two specimens of *B. schüppeli* Dej. They were running on the sandy flats which abound along the river-side. On 3rd June we paid another visit to this locality, and on this occasion five specimens found their way into my collecting bottle. This is the locality where *B. schüppeli* was discovered by Bold more than half a century ago, and Mr. E. A. Newbery, to whom specimens were sent for verification, informs us that it has not been taken in Britain for a good many years.—JAS. MURRAY, 11, Close Street, Carlisle, 13th July 1899.

NOTES AND NEWS.

The 'First Supplement' to Messrs. Britten and Boulger's 'Biographical Index of British and Irish Botanists' has lately appeared. It follows the method of, and its pagination runs on from the end of, the parent volume. Only a limited number of copies have been done, presumably in consequence of the poor sale of the 'Index.' It is the only work on the subject, and it is no credit to workers in English botany that the compilers should have to bear a loss after years of careful and thankless labour. The book fills its gap in biographical literature. The present writer can add nothing, except praise, where it is undoubtedly due. The price is eighteenpence for thirty pages and wrappers, a by no means exorbitant figure

By the recent death of Edward Woodthorpe, of Alford, Lincolnshire, a victim of phthisis, the county has lost a most promising young naturalist. Entomology was his rôle; the lepidoptera his choice. He aimed at forming a collection showing the life history of each species. In this he displayed considerable taste in arrangement, while his data as to time and place were always to be relied on as accurate. He became a skilful preparer of larvæ, and was a bright example of what a youth in humble life can do with the necessarily limited time at his disposal. He was the first to take the Purple Emperor (*Apatura iris*) at Welton Wood, near Alford. His captures I had the opportunity of seeing.—J. E. M., 17th May 1899.

Lepidopterists will be sorry to hear of the death of an old member of the Yorkshire Naturalists' Union, Mr. George Jackson, of Nunnery Lane, York, at the age of 63, which took place on the 30th June, after a long and lingering illness. He was a hard-working entomologist and a thorough field naturalist of the old type, and he possessed a large and varied experience in the branch (Lepidoptera) in which he was interested. He was very successful in breeding the York variety of *Arctia lubricipeda*, many of the cabinets in the country being enriched by series from his results. He has also bred at different times very fine varieties of *Arctia caja* and *Abraxas grossulariata*, and his collection (as a local one) might be considered the best in the district. He was one of the founders of the York and District Field Naturalists' Society, and was ever ready to impart any information to its members belonging to that section to which he was devoutly attached.—R. DUTTON.

AIR BLASTS BELOW GROUND.

HENRY PRESTON, F.G.S.,

Hawthornden Villa, Grantham; Geological Secretary to the Lincolnshire Naturalists' Union.

In relation to soil and rock-air, bacteriology, and a whole class of facts especially interesting to naturalists at the present time, I send you a few particulars of an air-blast in a well recently sunk at Boothby Pagnell, Lincolnshire, by the Hon. Maurice R. Gifford. On 23rd January 1899, Mr. Gifford wrote to me respecting this well, which was then being sunk:—'At the 106 feet bed there is a most tremendous blast of fresh air from a fissure in the rock. On Saturday last (21st January), the wind being S.W., it blew the candles out in the bottom of the well. To-day (afternoon), the wind being N.W., if you put the candles near the fissure it draws the flame out, and when I was down this morning the wind was roaring in the fissure as it escaped like blowing a hurricane.'

Now the 106 feet bed of rock above mentioned is 68 feet in the Lincolnshire Oolite, which is overlaid at Boothby Pagnell by 38 feet of clays and limestones of the Great Oolite and Upper Estuarine series. On Thursday, 26th January, I went down the well and saw the fissures. There are three openings, varying in size. Into the principal one a man could easily insert his arm and shoulder, but I did not measure it. The blast at that time from this largest fissure would blow out a candle held six inches from the opening into the well. The air was quite 'fresh,' and so cold that the men had to work with jackets and scarves on. On 23rd February the blast was still blowing into the well; on the 24th there was a slight draw from the well into the fissure; in fact, the 'blowing' and 'drawing' varied very often, as was noticed by the smoke from the blasting shots. Water was first reached at 131 feet, or 25 feet below the fissures. The theory of explanation drawn up at the time when all the facts were before me I give here; it is as follows:—The underground waters having risen in consequence of the heavy rains during the past few weeks, the air in the rocks and that which was drawn down entangled in the descending water, had become compressed, and would even be pushed before the water in its easterly and downwards course, if no sufficient outlet was found, and this compressed air would not have the same opportunity to escape during a continuance of wet weather such as was the case at the time. Therefore as soon as the fissure was opened

there would be a strong rush of air. The intensity and length of time it continued to flow would be dependent upon the extent of the compression, i.e., upon the rainfall, the size of the fissures, and the means of escape which the air had elsewhere. After the excess was blown off, the water level would become normal, but as the water slowly sank after the rain ceased by escaping in springs, etc., at a lower level, air would be drawn from the nearest point of access, for a flow of underground water cannot take place without a corresponding air movement, hence a back draught would occur into the fissures, which might or might not continue. The fall of the water level might be stopped by more rain, or less violently by a fall in barometric pressure. In the case of this fissure, while under observation, barometric pressure did not seem to explain matters much. I have seen no reason to alter this opinion, although when writing on the matter, as I hope to do in a paper on 'The underground water supply from the Lincolnshire Oolite,' I may enlarge upon it. I have made numerous inquiries, but can only obtain the following confirmatory facts:—Mr. J. E. Noble, well-borer, of Thurlby, writes me, 'I had a similar experience at Stamford this winter (1898-9). At a depth of 40 feet, with a bore of seven inches, the draught of air would blow out a lighted candle at the ground level. The bore was then quite dry, and by dropping some lighted waste soaked in paraffin into it, we learned that it would carry the waste close to the opposite side of the bore.'

If readers of 'The Naturalist' have any further facts about underground air blasts, I should be glad if they would communicate with me on the point, or publish them in its pages; for, as my friend Mr. Woodruffe Peacock has pointed out to me, every fact of this kind is most invaluable in showing how soils are aërated by a downward and upward draught of air as the rain falls or ceases, or even as the barometer changes. It is only by noting such facts as they come under observation that the presence of fresh air in the soil, which the œrobic micro-organisms must have to enable them to break up and re-form the soluble particles of organic matter, can be fully demonstrated.

NOTE—ORNITHOLOGY.

Short-eared Owl at Ackworth.—The Ackworth School Boys' Natural History Society have to note with regret that a specimen of the Short-eared Owl (*Asio accipibrinus*) was shot on Ackworth School estate, Saturday, 16th September inst.—Jos. Neale, Ackworth School, 19th Sept. 1899.

INTERESTING BOTANICAL FINDS IN CUMBERLAND.

WILLIAM HODGSON, A.L.S.,
Workington, Cumberland.

In the course of the last few weeks several finds of plants not of common or everyday occurrence have taken place, chiefly in the immediate neighbourhood of Carlisle. These finds are due to the persevering efforts of Mr. Wm. Thomson, of 16, Cavendish Place, in that city, who has collected the following amongst other and commoner species which have been forwarded to me for inspection and corroboration or otherwise of the finder's own ideas as to their identity. I am glad to report that these ideas have in the main proved quite accurate. One of the most productive stations examined by Mr. Thomson appears to have been a gravel bed by the river Eden, opposite the village of Grinsdale, and on the right bank of the river. This gravel bed was mentioned to me some years ago by Mr. W. Duckworth, of Ulverston, during his abode in Carlisle, as a favourite hunting ground in his time, and Mr. Thomson's recent forays go to verify Mr. Duckworth's high opinion of its attractiveness in the eyes of a student of botany. The following, with other species, have been gathered there recently, viz.:—*Raphanus sativus, Asperula arvensis, Saponaria Vaccaria, Scandix Pecten-veneris, Caucalis latifolia, Caucalis nodosa, Silaus pratensis,* this last at King Garth, a fishery station belonging to the Carlisle Corporation, where also he gathered specimens of *Thalictrum minus* var. *montanum*, a lakeland species which I had met with long years ago, growing at the foot of the cliffs of Catchedicam in the Ullswater district of Westmorland. It is a 'far cry,' surely, from the latter station to King Garth. Mr. Thomson further noted the occurrence of the Knotted Hedge Parsley on the opposite bank of the river, near the Caledonian railway bridge. *Erigeron acre* and *Arabis sagittata* were found on a garden wall near the Gelt Woods, between Carlisle and Brampton; *Pulicaria dysenterica* on the Eden banks nearly opposite to the village of Kirkandrews. This plant was formerly reported from Etterby Scar, nearly opposite to Carlisle city, but it is questionable, in the estimation of the Rev. H. Friend, whether it any longer grows there. On King Moor, to the north of the city, Mr. Thomson succeeded in gathering specimens of *Carum verticillatum*, which is also a confirmation of previous records by Mr. Duckworth and Mr. T. C. Heysham, at one time Mayor

of the city, and a naturalist of more than average ability. *Centunculus minimus,* heretofore little known to the county, was found both at King Moor and by the edge of Thurstonfield Lough, a sheet of water a few miles from Carlisle to the west. From this station also came specimens of *Radiola millegrana, Sparganium simplex,* and *Bidens tripartita,* and from the railway edges between Drumburgh and Port Carlisle, *Fagopyrum esculentum, Lysimachia vulgaris,* and *Scirpus maritimus*; *Sedum album,* from a garden wall at Burgh-by-Sands; *Peplis portula* and *Œnanthe fistulosa,* from Monkhill Lough; *Origanum vulgare,* from Cargo and Rockcliffe, etc.

In connection with the above records we may note, as interesting, the similarity in the finds on the river Eden gravel beds by Mr. Thomson, and those from the same class of stations on the river Derwent as described by myself in 1896. Mr. Thomson has since reported the occurrence of *Œnanthe Lachenalii* from the vicinity of Bowness-on-Solway, and of a considerable patch of *Melissa officinalis* from the upper portion of the Green at Dalston, towards Hawksdale. This last, of course, is a garden escape.

18th September 1899.

NOTES—ORNITHOLOGY.

Nightingale at Doncaster.—A Nightingale (*Daulias luscinia*) has been constantly singing in a garden in Regent Square in this town during the present spring.—H. H. CORBETT, Doncaster, 5th July 1899.

Colour-variety of Chaffinch at Stixwould, Lincolnshire.—The son of a farmer, young Gibbins, of the Abbey Farm, Stixwould, recently shot a Chaffinch (*Fringilla cælebs*) with the following plumage:—Head, white and slate colour; breast, light chocolate; wings, white, black, and sage-green; tail, slate colour. Another was seen with it, with more white about it. They were feeding with Sparrows in the stackyard. I saw this stuffed by Mr. Fieldsend, of Lincoln, on 7th June.—J. CONWAY WALTER, Langton Rectory, Horncastle, 12th June 1899.

Cleverly-constructed Thrush's Nest in Lancashire.—I wish to note a Song Thrush's nest in a garden near here. It is in a small fir and supported by two dry stems of the nettle wound round side branches of the fir and fastened into the nest. On the other side dry grasses are also wound round the main trunk and fastened into the nest. The gardener says he has known Thrushes' nests blown down in the garden, but this nest was not in an exposed place and seemed sufficiently supported by the fir branch on which it rested. The nearest similar contrivance I have seen was in the nest of a Garden Warbler (*Sylvia hortensis*) in my garden here, in the top of a small birch, and between seven and eight feet from the ground. The bird had used some stems, six inches long or more, and twined them round the small twigs on an adjoining little branch of the tree, thus giving the nest support against the wind, to which it was much exposed. —JOHN P. THOMASSON, Woodside, Bolton, 3rd April 1899.

[A couple of photographs sent for editorial inspection by Mr. Thomasson, showed the nests from two different points of view.—ED.]

NOTTINGHAMSHIRE DIPTERA:

ADDITIONS AND CORRECTIONS TO MR. PERCY H. GRIMSHAW'S PRELIMINARY LIST OF MARCH AND APRIL 1898.

Rev. A. THORNLEY, M.A., F.E.S., F.L.S.,

Vicar of South Leverton, Notts.

Owing to pressure of work, Mr. Grimshaw has asked me to continue his preliminary lists of the Diptera of the counties of Nottingham and Lincoln. The naming and verification has, however, been done very largely by him, and he has earned the gratitude of the entomologists of these two counties for the great trouble he has taken over local collections of this neglected order of insects. In the county of Nottingham we have not yet many workers, but I am indebted to Professor J. W. Carr, of the University College, and some few other members of our Naturalists' Society, for several good records. I have also recently received great assistance from our veteran dipterist, Dr. R. H. Meade, of Bradford, whose great kindness I would here publicly acknowledge. There are 45 new records for the county of Nottingham, thus bringing up the number of species recorded to 279. There is one serious error to correct. The examples recorded in the previous list as *Arctophila mussitans* were not that species, and are now correctly named in the present list. New records are marked with an asterisk. Other species previously recorded are inserted again, because they have been found in new localities, or the discovery of some peculiarity of habit, etc., calls for further remark. It might seem of but small importance to record the date of the capture of a specimen, yet this is often a matter of the utmost moment; for example, the dates of the appearance of pests, such as Hessian Fly. The asterisk * signifies a species new to the county.

Fam. MYCETOPHILIDÆ.

****Mycetophila cingulum*** Mg. One ♂, South Leverton, October 1897 (Thornley).

****Mycetophila punctata*** Mg. One ♂, 20th January 1898; one ♀, 9th February 1898; both South Leverton (Thornley).

****Scatopse notata*** L. Two ♂s, South Leverton, 13th March 1898 (Thornley).

Fam. BIBIONIDÆ.

Bibio marci L. Gedling, ♂ and ♀, 22nd May 1898 (J. W. Carr). I once saw a fine dance of this species by a sheltered hedge-side, 10th May 1897.

Fam. CULICIDÆ.

****Culex annulatus*** Schrk. Three ♀s, 26th January, 30th March, 4th May 1898, South Leverton (Thornley).

****Culex nemorosus*** Mg. South Leverton, three ♀s, 12th and 26th January, 10th February 1898 (Thornley).

****Anopheles maculipennis*** Mg. South Leverton, one ♀, 7th April 1898; one ♀, 10th February 1898 (Thornley).

Fam. PTYCHOPTERIDÆ.

****Ptychoptera paludosa*** Mg. South Leverton, one ♀, June 1897 (Thornley).

Fam. LIMNOBIDÆ.

****Limnobia quadrinotata*** Mg. Treswell Wood, one ♀, 27th June 1898 (Thornley).

****Trichocera hiemalis*** DeG. South Leverton, abundant in winter (Thornley).

****Pœcilostoma punctata*** Schrk. South Leverton, one ♂, 7th May 1898 (Thornley).

Fam. TIPULIDÆ.

****Pachyrrhina quadrifaria*** Mg. South Leverton, one ♀, July 1898 (Thornley).

****Pachyrrhina histrio*** Fab. South Leverton, two ♂s and one ♀, July 1898 (Thornley).

Pachyrrhina maculosa Mg. Nottingham, a pair, 16th July 1898 (J. W. Carr).

Fam STRATIOMYIDÆ.

****Oxycera pygmæa*** Fln. Misterton, one ♂, 7th July 1898 (Thornley).

****Beris fuscipes*** Mg. Treswell Wood, one ♀, 27th June 1898 (Thornley).

Sargus cuprarius L. var. ***nubeculosus*** Ztt. Nottingham (Ryles).

Fam. LEPTIDÆ.

Leptis tringaria L. South Leverton, one ♀, 7th July 1898 (Thornley)

Fam. ASILIDÆ.

***Leptogaster cylindrica** DeG. South Leverton, ♂ and ♀, 9th July 1898 (Thornley).

***Asilus crabroniformis** L. Bulwell Forest, Nottingham, taken some years ago (see J. W. Carr, 'Naturalist,' June 1898, p. 170).

Fam. BOMBYLIDÆ.

***Bombylius major** L. Winkburn Woods, Notts, several specimens in April 1898 (J. W. Carr; see 'The Naturalist,' June 1898, p. 170). Treswell Wood, one example, 6th May 1899 (Thornley).

Fam. EMPIDÆ.

***Empis pennipes** L. Treswell Wood, one ♂ and four ♀s, 27th June 1898 (Thornley).

***Cyrtoma spuria** Fln. Treswell Wood, one ♀, 27th June 1898 (Thornley).

Fam. DOLICHOPODIDÆ.

***Dolichopus griseipennis** Stan. Treswell Wood, one ♂, 27th June 1898 (Thornley).

***Dolichopus trivialis** Hal. Treswell Wood, two ♂s, 27th June 1898; South Leverton, one ♂, 9th July 1898 (Thornley).

***Chrysotus gramineus** Fln. Treswell Wood, one ♀, 27th June 1898 (Thornley).

***Scellus notatus** Fab. South Leverton, one ♀, July 1898.

Fam. LONCHOPTERIDÆ.

***Lonchoptera lacustris** Mg. South Leverton, one ♀, 7th May 1898 (Thornley).

Fam. SYRPHIDÆ.

***Pipizella virens** F. One example from Notts, locality label lost (Thornley, 1898).

***Chilosia grossa** Fln. Roe Woods, Winkburn, one ♂, 11th April 1898 (J. W. Carr).

***Chilosia flavimana** Mg. Gedling, one ♀, 22nd May 1898 (J. W. Carr).

***Platychirus albimanus** Fab. Nottingham, one ♂ and three ♀s, 27th July 1898 (J. W. Carr).

***Platychirus manicatus** Mg. Gedling, three ♂s, 22nd May 1898 (Carr); Nuthall, two ♂s, 26th May 1898 (Carr); Colston Bassett, one ♂, 8th May 1898 (Carr); Nottingham, one ♂, 28th July 1898 (Carr).

Platychirus scutatus Mg. Nottingham, one ♂, 27th July 1898 (J. W. Carr).

Syrphus balteatus DeG. Nottingham, one ♂, 24th July; one ♀, 5th October 1898 (J. W. Carr).

Syrphus luniger Mg. Nottingham, two ♀s, 24th and 28th July 1898 (J. W. Carr).

Syrphus corollæ F. Nottingham, three ♂s, 24th and 27th July 1898 (J. W. Carr); Hucknall Torkard, 7th June 1898 (J. W. Carr).

Syrphus ribesii L. Nottingham, three ♂s, 24th July 1898 (J. W. Carr); Gedling, one ♂, 22nd May 1898 (J. W. Carr); Nether Langwith, one ♂, 20th July 1898 (J. W. Carr).

Catabomba pyrastri L. Nottingham, 28th July 1898 (J. W. Carr).

Volucella bomböylans L. Teversall, one ♀ (red-tipped form), 14th July 1898 (J. W. Carr).

[***Arctophila mussitans*** F. Must be removed from the List. The examples so named were species of *Criorrhina*, viz. :]

****Criorrhina floccosa*** Mg. South Leverton, one ♀, June 1896; one ♂, May 1897 (Thornley).

****Criorrhina oxyacanthæ*** Mg. South Leverton, one ♂, June 1896 (Thornley).

Eristalis tenax L. Nottingham, several specimens, 24th July 1898, with a very red variety of the ♂; and 8th to 12th October 1898 (J. W. Carr).

Eristalis arbustorum L. Gedling, 18th July 1898 (J. W. Carr).

Eristalis pertinax Scop. Nottingham, 9th October 1898 (J. W. Carr); Gedling, 24th April 1898 (J. W. Carr); Roe Woods, Winkburn, 8th and 11th May 1898 (J. W. Carr); Broxtowe, April 1898 (Freestone).

Syritta pipiens L. Nottingham, ♂ and ♀, 8th October 1898 (J. W. Carr).

****Chrysotoxum arcuatum.*** South Leverton, one ♀, June 1898 (Thornley).

Through the kindness of Dr. Meade I am able to add—

****Chilosia intonsa*** Lw. South Leverton, four ♀s, May and July 1897 (Thornley).

****Pipiza* (*Cnemodon*) *vitripennis*** Mg. South Leverton, one ♂, May 1897 (Thornley).

Fam. CONOPIDÆ.

***Conops flavipes** L. South Leverton, one example, August 1897 (Thornley).

***Myopa testacea** L. Rainworth, one ♂, 28th May 1898 (J. W. Carr).

Fam. ŒSTRIDÆ.

***Œstrus ovis** L. South Leverton, July 1898 (Gent.).

Fam. ANTHOMYIDÆ.

***Hyetodesia lucorum** Fln. Roe Woods, Winkburn, one ♂, 11th May 1898 (J. W. Carr).

***Hyetodesia basalis** Ztt. Treswell Wood, several, July 1897 and 1898 (Thornley).

Fam. HELOMYZIDÆ.

***Tephrochlamys rufiventris** Mg. South Leverton, common in the house, 9th February 1898 (Thornley); Treswell Wood, 5th March 1898 (Thornley).

***Blepharoptera serrata** L. South Leverton, common in the house and stable on 31st January and 9th February 1898 (Thornley); Roe Woods, Winkburn, 2nd April 1898; Nottingham, 10th March 1898 (J. W. Carr).

Fam. SCIOMYZIDÆ.

***Tetanocera elata** F. Treswell Wood, one ♂, 27th June 1898 (Thornley).

***Tetanocera punctulata** Scop. Treswell Wood, 27th June 1898 (Thornley).

***Limnia unguicornis** Scop. Treswell Wood, one ♂, 27th June 1898 (Thornley).

***Elgiva albiseta** Scop. Linby, 7th April 1898 (J. W. Carr).

***Sepedon sphegeus** F. South Leverton, two examples, September 1898 (Thornley).

Fam. ORTALIDÆ.

***Ptilonota centralis** F. Treswell Wood, two examples, 29th May 1899 (Thornley).

Fam. TRYPETIDÆ.

***Tephritis miliaria** Schrk. Treswell Wood, one ♀, 27th June 1898 (Thornley).

Fam. LONCHÆIDÆ.

***Lonchæa vaginalis** Fln. South Leverton, two ♂s, May 1897 (Thornley).

Fam. BORBORIDÆ.

****Borborus geniculatus*** Mcq. South Leverton, two examples, 7th April 1898 (Thornley).

****Borborus equinus*** Fln. South Leverton, 29th January 1898 (Thornley).

****Borborus niger*** Mg. South Leverton, September 1897 and 17th April 1898 (Thornley).

****Phora rufipes*** Mg. South Leverton, abundant, taken on the following dates:—30th January, 10th February, 2nd and 17th March, 7th May 1898 (Thornley).

Fam. PHYTOMYZIDÆ.

****Phytomyza obscurella*** Fln. South Leverton, common (Thornley). The larvæ of this little fly feed between the upper and lower surface on the parenchyma of holly leaves; sometimes quite disfiguring the trees by giving the leaves a blistered appearance. The fly appears in May. According to Dr. Meade there seems yet to be some difficulty about the specific name.—A. T.

NOTES—LEPIDOPTERA.

***Vanessa antiopa* at Scarborough.**—A specimen of the Camberwell Beauty (*Vanessa antiopa*) was seen on Oliver's Mount on the 10th September inst.—J. H. Rowntree, Scarborough, 15th September 1899.

***Pyralis fimbrialis* at Doncaster.**—This morning I had a female of the above species brought to me. It was found dead in this house in the centre of Doncaster. The only records for the county in Porritt's List are from York.—H. H. Corbett, Doncaster, 5th July 1899.

Abundance of *Grammesia trigrammica* at Doncaster.—During the past ten years I have only seen two specimens of this species at Doncaster; but this year it is one of the commonest insects at 'sugar.'—H. H. Corbett, Doncaster, 5th July 1899.

Hummingbird Hawkmoth at Ackworth.—The Ackworth School Boys' Natural History Society have to note that Hummingbird Hawkmoths (*Macroglossa stellatarum*) have been frequent all the autumn in many gardens in our neighbourhood.—Jos. Neale, Ackworth School, 19th Sept. 1899.

Abundance of the Hummingbird Hawkmoth.—On 31st August I found a freshly-emerged specimen of the Hummingbird Hawkmoth (*Macroglossa stellatarum*) at rest in a chink of a wall in the railway station at Alderley Edge. When staying at Wisbech St. Mary, Cambridgeshire, during the first fortnight in September, I had many opportunities of watching this interesting species, which has been unusually abundant there, as it has in other parts of the country, during the past hot summer. The moths frequently visited jasmine and honeysuckle in the garden, and some beds of geraniums proved specially attractive. From early morning until seven o'clock in the evening I could always count on seeing one or two of the moths poised above the flowers, or passing with a swift horizontal movement from one truss of bloom to another; the hum of their rapidly-vibrating wings being audible at a distance of several feet. On one occasion five of the moths were in view at one time. During flight the long proboscis appeared to be always fully extended. Rain seemed to affect them but slightly, for on two wet days I watched the insects busily probing the geraniums for nectar during sharp showers.—Chas. Oldham, Alderley Edge, 22nd Sept. 1899.

THE FLORULA OF BARE, WEST LANCASTER.

F. ARNOLD LEES, M.R.C.S.,
Leeds.

EXCEPT Walney and the limestone south of Silverdale, the vice-county of West Lancaster has been sadly neglected since the Rev. E. F. Linton resided at Preston, from which it follows that the observations of a few days in early September (1899) made on the beach of the Morecambe estuary, strictly confined to the shore and a mile inland between Bare and Hest Bank, have some little value from the definite parochial limit, and the thoroughness with which the small field was investigated by the writer. The appended asterisk indicates the species that are adventive although naturalised; and the letters 'N.C.R.' stand for a new vice-county record for the Watsonian area 60 of *Topographical Botany*.

Clematis Vitalba.* Several fine plants about Bare, crowning and festooning Yews amongst other trees, but, of course, originally sown or planted.

Adonis autumnalis.* Waste arable where building operations at Bare have broken the ground; and with it

Meconopsis cambrica* about poultry-runs in rough field-corners: probably garden ground originally—the stations being doomed of bricks and mortar both species must soon disappear, as well as their companions, Figwort, Mugwort, Agrimony, and Burdock.

Silene maritima. Several pebble banks between Bare and Hest Bank, accompanied by

Honkeneya peploides, locally termed by rustic children 'Fat-grass'—a term not in Britten and Holland's classic Plant-Name Dictionary.

Geranium purpureum Forster. N.C.R. This or a deep-red, divaricate and prostrate form of the ubiquitous 'Stinking Bob,' modified by environment, was noticed on a pebbly spit of foreshore north of Bare, growing with the 'Fat-grass' and succulent great-headed *Matricaria salina*, hard by several spray-washed boulders medalled over with *Parmelia parietina* and other lichens.

Ononis repens (***inermis*** Lange). Here and there on the beach banks, with

Lotus crassifolius Pers., but neither abundant nor continuously.

October 1899.

Prunus fruticans Weihe. N.C.R. (Perhaps this equals var. b. *macrocarpa* Wallr.). The large-fruited yellow-green leaved Sloe. One or two bushes in thicket near canal south of Hest Bank. This might pass for *Prunus insititia*, the wild Bullace, but it was only in plum very sparingly.

Rubus rusticanus Merc. was the vastly preponderant Bramble in the hedges of the narrow field 'slypes' or lanes through the pastures, but now and then by dikes or on earth-banks the writer noticed *Rubus rhamnifolius*, *R. radula*, *R. corylifolius*, and *R. cæsius*.

Spiræa Ulmaria var. ***denudata*** Hayne. N.C.R. This nude form of the white under-leaf Queen of the Meadow was noted to occur at intervals for over half a mile on the west bank of the Lancaster Canal north of Bare. It is a less-robust plant than the silver leaved type, and flowered here as elsewhere only sparingly. It usually grows *in* the water not in peat-wet soil, and may be more frequent than the sparing records (eight or nine counties) would indicate. The early leaves of the type even, springing up through the standing fluid of a springtime ditch are unfelted I have noticed.

Hippuris vulgaris. N.C.R. In several plashes and muddy hedge bottoms about Bare. I was told a curiously-distorted notion about this by a farmer-like man, who watched me gazing at the serried ranks in the water. He gravely informed me that it was called Marestails, because it only grew in water wherein 'mares, but I think horses, too, had staled'—that is, made water! I objected that there were 'Horsetails' as well. 'Yes,' he admitted, 'and some on 'em calls it that, I've heard, tew,' or a saving phrase to similar effect.

Lythrum Salicaria. Frequent by drains, and the Lancaster Canal south of Hest Bank.

Cornus sanguinea. In hedge, Hest Bank.

Sium erectum. Brook, Bare Lane.

Tragopogon minor. Sea banks.

Carduus tenuiflorus, with

Carlina vulgaris very sparingly on the sandier banks of the beach.

Filago germanica. N.C.R. A form approaching *spathulata* seen sparingly on a hen-run near Bare, where the earth had been much scratched up.

Inula dysenterica. Hedge-bank of one lane off Bare towards Poulton.

Matricaria salina Bab. N.C.R. This handsomest of the 'Agathas' or 'False Marguerites,' with neat foliage and disproportionately large anthodes, grew in clumps on the pebble beyond Scalestones Point; with a bold condensed form of *Linaria vulgaris* almost meriting the term '*speciosa*,' but that its 'fat' leaves were only one-nerved. The salinity of the air seems to dwarf the fodder and enlarge the blossoms of many plants, so that, weedy inland, they become posy-worth by the sea.

Achillea Ptarmica, with full rosy blossom heads, grew by a ditch in one spot inland, and on a bank near it the common Yarrow was of a fine red also. The Eyebright of the turf showed a disposition to empurpling of the corolla as well. This may be an exceptional seasonal influence, for the *Convolvulus Sepium* of the hedges was pinked, too, in places; and the dykeful Mints were purple-bronze of leaf everywhere; likewise the Black Bryony and Bindweed foliage. Nowhere in the district, either, did the writer notice an albino, a white Harebell, Bugle, Betony Basil, or Self-heal, such as are some years so very frequent.

Gentiana Amarella. On sea bank turf north of Bare, sparingly, with *Scabiosa Columbaria,* rayed *Centaurea nigra*, *Erythræa Centaurium*, and *Lycopsis arvensis,* Bare, one plant only.

Calamintha Clinopodium Spenn., N.C.R., although rather a common (90 vice-counties) high-census species. This was noted on dry, bushy banks in three other spots.

Verbascum Blattaria.* Moth Mullein. N.C.R. Three plants in bloom of this fine biennial grew in a poultry-run on a waste strip of ground near the Elms Hotel at Bare. Possibly alien, but harder than usual to decide, as *Verbascum Thapsus* grew near it, and in several other places, even on the shingles by the sea a little to the north. The Verbascums, too, are everywhere uncertain visitors, and their seeds are amongst those which can lie, viable yet ungerminating, in soil for considerable periods. This Moth Mullein, too, has, I see from Petty's Lake Lancashire Flora, turned up occasionally in gravelly places in Furness and Cartmel, at least since 1843, the date of the first record. In the north at any rate—and now seldomer than ever—are these biennial Mulleins grown in gardens as border flowers.

October 1899.

Veronica Anagallis. Brook, Bare.

Linaria Cymbalaria.* Old walls, Bare.

Mentha sativa var. ***rivalis.*** N.C.R. By the Lancaster Canal, south of Hest Bank, with a bushier, taller, red-stemmed mint of the *sativa* section, which most probably is *M. rubra* Sm., but as it was on the further bank of the canal I could not get to it. On the tow-path side, where the herbage was much trodden and beaten down, I found only a red-stemmed subglabrous form, with long runners. At the water-edge grew also, fine and handsome, the English Pickerel Weed, *Polygonum amphibium,* and *Myosotis palustris;* but although by their juxta-contrast they made a lovely picture, both are on record already for the vice-county.

Lycopus europæus. Gipsywort. In several places.

Iris Pseudacorus L. Yellow Flag. Marshes and pool-sides, frequent. Mentioned here only for its extraordinary rustic name. The seed clubs, at this date opening lip-like and revealing the (as yet) ivorine seed squares within, are called (so the urchins told me) thereabout 'Eyeteeth' or 'Teatheads.' Boys gather the full-grown green but hard triangulate pods and pit one against another in a war game, like unto that lads play with Ribwort Plantain or Horse-chestnuts perforated and slung on a piece of whipcord.

Sparganium simplex. Bare brook.

Sparganium ramosum. Frequent. The caltropsian burr-fruits of both these are styled 'Wiskers,' or 'Whiskers' by the Bare boys, and a similar game-use is made of them. I never heard either of these names in any other county, and Britten has neither in his book, before alluded to.

Elodea canadensis.* In the canal south of Hest Bank, 'less common than it used to be,' I was told. Is this aquarium outcast now again on the decline in this country?

Juncus diffusus Hoppe. N.C.R. Three or four clumps of this hybrid in a marsy pasture near a turkey-run, south of Hest Bank; *J. effusus* near but not *J. glaucus.*

Juncus obtusiflorus Ehrh. N.C.R. In a bed of *Arundo Phragmites,* by a brook, near the L. & N.-W. Rail. line, north of Bare. A few luxuriant stems (3 feet high) only.

Scirpus lacustris L. N.C.R. Noted in one place only, by the Marestail duck-pool at the back of Bare village. With it grows *Eleocharis palustris.*

Carex ampullacea (***rostrata*** Stokes). N.C.R. A small form of this, not—*me judice*—the *elatior* Blytt, but too advanced in its shedden catkins to be sure it is *involuta,* though its wiry leaves were rolled and narrow, grew in tufts by a ditch bordering the reed-bed mentioned above in connection with *Juncus obtusiflorus.* The type was seen on Torrisholme moss. To make an end to these excursive remarks the only Gramen of any note seen besides *Arundo* was

Triticum littorale Reichb. N.C.R. The squary glaucus-eared grass formerly regarded as a variety of *T. repens,* but now allocated to *T. pungens.* I am not sure (with Watson, Top. Bot., p. 503), however, that there is not a bloomy-blue glumed state of both 'species,' since the *pungens* of the southern and eastern coasts is a plant of sandhills, and this grew on a steep hedge-bank facing the bay above Scalestones Point; and the 'sea change' facies of plants at the sheltered head of Morecambe Bay is much less marked than even on Walney, not to say the Cumberland seaboard. Explicit.

9th September 1899.

NOTE—COLEOPTERA.

***Rhipiphorus paradoxus* and *Carabus granulatus* near Ackworth.**—The Ackworth School Boys' Natural History Society have to record that this September two specimens were taken from separate Wasps' nests of *Rhipiphorus* (*Metœcus*) *paradoxus*, female; and that at Ferrybridge, climbing in osiers as if in search of larvæ for food, were found two specimens of *Carabus granulatus.* These finds are new records for us. -Jos. Neale. Ackworth School, 19th September 1899.

NOTES—FLOWERING PLANTS.

Ferrybridge Plant Records.—The Ackworth School Boys' Natural History Society have to note that in June were gathered near Ferrybridge *Allium Scorodoprasum* and *Scirpus sylvaticus.* They were identified by Mr. John Farrah, and are both new records for us.—Jos. Neale, Ackworth School, 19th Sept. 1899.

Double Ling at Ullswater.—A few specimens of *Calluna vulgaris flore pleno* (Double Ling) were found growing near to Ullswater Lake in the last week of August. I sent one to the Rev. W. Fowler, who said he had not previously seen it. In an old Flora it is said to have been observed in Cornwall only.—Benj. Crow, Louth, 15th Sept. 1899.

***Sedum anglicum* in Littondale, Mid West Yorkshire.**—Yesterday I found *Sedum anglicum* growing and in bloom between Arncliffe and Hawkswick. It was in a dry, sandy, and stony position, which is sometimes flooded, far from the public road, and about a mile from any house. The plants were numerous and were evidently suffering from the drought. This is, I believe, the first record for this part of Yorkshire. Mr. F. A. Lees speaks of it as 'very rare on Silurian slate;' he has seen it on Howgill Fells. Littondale is on the limestone. The seeds must have been carried by a bird to the place mentioned above, or it is possibly a 'garden escape,' but it may now be said to be firmly established here. [Name correct, J. G. Baker.]—W. A. Shuffrey, Arncliffe Vicarage, Skipton, 12th August 1899.

NOTE—MOSSES.

***Hypnum ochraceum* in Wharfedale.**—Within the last few weeks I have found *Hypnum ochraceum* Turn. in two small patches, not far apart, on Ilkley Moor. This is I believe a new record for the district. The only reference in the Flora of West Yorkshire (F. Arnold Lees, 1888) is a doubtful one in brackets, viz., at p. 592, '[Beamsley rocks; L. C. Miall (vide Naturalist, 1866, p. 266)].' This refers to a record in Miall and Carrington's Flora of the West Riding, 1862, p. 85, viz. :—'*Hypnum scorpioides* L. near Beamsley rocks, L. C. Miall,' which was corrected by Professor Miall in the Naturalist, 1866, p. 266, in a paper on the Botany of Malham, under *H. scorpioides*—'I believe the Beamsley rocks, cited as a station in "The Flora of the West Riding" with my name is erroneous. The moss I found there was *Limnobium* (*Hypnum*) *ochraceum*.' Has there been any record for Wharfedale since the above?—C. P. HOBKIRK, Ilkley, 20th July 1899.

NOTES—FLOWERING PLANTS.

***Stratiotes aloidea* near Doncaster.**—This plant is now flowering freely in a ditch by the side of the Great Northern Railway between Doncaster and Rossington.—H. H. CORBETT, Doncaster, 5th July 1899.

***Ranunculus arvensis* and *Epilobium hirsutum* at 750 feet in Wharfedale.**—The former of these plants has appeared in a border in my garden. This may be worthy of record, as there is no notice of it in Wharfedale other than a record near Wetherby in Mr. Arnold Lees' 'Flora of West Yorkshire.' The latter plant has appeared for the first time in this dale, under a Holly tree in the same garden. Mr. Lees says it is 'rare in the dales above 450 feet.' I have never seen it before this above Kilnsey.—W. A. SHUFFREY, Arncliffe Vicarage, 10th August 1899.

Blea Tarn and *Lobelia Dortmanna*.—Since some comments of mine regarding the identity of the sheet of water so named appeared in your issue for January last, several of the correspondents of 'The Naturalist' have from time to time attempted to clear up the doubt as to which of the Lakeland tarns was meant in Mr. J. G. Baker's 'Flora of the English Lake District,' pp. 142-3. A few weeks have elapsed since, in the course of a correspondence with Mr. Baker on other botanical matters, I suggested that he should clear up the mystery by stating what tarn was meant. His reply was to the effect that he had himself forgotten utterly in which sheet of water he had observed the Lobelia, but suggested that the altitude assigned by him, viz., 500 yards, might be sufficient to determine the dispute. I had mentioned my belief that Blea Tarn, under High Street, in Westmorland, was the locality meant by Mr. Baker, a view which has hitherto failed to meet with general acceptance. Among the objectors is Mr. Charles Waterfall, of Hull, who in the April number of 'The Naturalist' states that the particular sheet of water selected by me is not Blea *Tarn* at all, but Blea *Water*. Mr. Waterfall may not have had an experience of Lakeland sufficient to prove to him that the terms *Tarn* and *Water* are in numberless instances synonymous, as I can personally vouch for after twenty years' residence in the most picturesque portion of the Lake Country. Moreover, in the 'Golden Penny,' for 3rd June of this year, appears a vignette over the heading, 'Blea Tarn at Sunrise,' while in the descriptive letterpress in the same column lower down the page it is styled Blea Water. The altitude of this tarn is given in 'Jenkinson's Guide' as 1,584 feet. Mr. Waterfall rightly judges that the Upper Tarn, Watendlath, is the same as Blea Tarn, which is situated about two miles above the Lower Tarn, and at an elevation of 1,562 feet. These two are the only Blea Tarns which at all correspond with Mr. Baker's given altitude of 1,500 feet. I have not visited personally the shore of either the Cumberland or Westmorland mere, but have repeatedly looked down upon both from a loftier standpoint on the surrounding fells, and should not be surprised to learn that the Water Lobelia is a tenant of both sheets of water.—WM. HODGSON, Workington, 18th August, 1899.

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For 1884,	in 'Naturalist,'	Dec. 1885,	pp. 394-406.
,, 1885,	,,	Nov. 1886,	pp. 349-362.
,, 1886,	,,	June 1888,	pp. 178-188.
,, 1887,	,,	Feb. 1889,	pp. 61-77.
,, 1888,	,,	April-May 1890,	pp. 121-138.
,, 1889,	,,	Nov. 1890,	pp. 339-350.
,, 1890,	,,	Oct.-Nov. 1891,	pp. 313-330.
,, 1891,	,,	July-Aug. 1892,	pp. 219-234.
,, 1892,	,,	Sept. 1893,	pp. 265-279.
,, 1893,	,,	Sept.-Oct. 1898,	pp. 273-296.
,, 1894,	,,	March-April 1899,	pp. 81-103.

I have to thank Mr. W. Denison Roebuck, F.L.S., and Mr. Alfred Harker, M.A., F.G.S., for assistance.

Particulars of papers, etc., omitted from the following list will be gladly received and included at the commencement of the 1896 Bibliography. Every effort will be made, however, to ensure these lists being as complete as possible.

The lists for 1896-1899 will be published as soon as possible, and it would render them more complete if editors of periodicals, secretaries of societies, and especially authors of papers in local journals, etc., would send copies to the editor of this journal at 259, Hyde Park Road, Leeds. Reprints and authors' separate copies should bear the name of the publication, the number of the volume or part, the *original* paging and the *actual* date of publication.

We would here refer to the difficulty of ascertaining the date of publication of certain Transactions and Proceedings, such as, for instance, those of the Manchester Geological Society; the date of the meeting reported does not afford any real clue, and we venture to suggest that the actual date of publication should always be indicated on the cover of each part

The Watsonian vice-counties are adopted throughout these bibliographies as more convenient and uniform in extent than

the political counties; those comprised within the North of England are the following:—

53, Lincoln S.; 54, Lincoln N.; 56, Notts.; 57, Derby; 58, Cheshire; 59, Lancashire S.; 60, Lancashire W.; 61, York S.E.; 62, York N.E.; 63, York S.W.; 64, York Mid W.; 65, York N.W.; 66, Durham; 67, Northumberland S.; 68, Cheviotland; 69, Westmorland with Furness and Cartmel; 70, Cumberland; and 71, Isle of Man; with their adjoining seas.

1893.

[W.] Boyd Dawkins. Lanc. S., Derbyshire.

The Coalfields of New South Wales [under 'comparison with the British Carboniferous Rocks' compares with the beds of Lancashire and Derbyshire]. Trans. Manch. Geol. Soc., Vol. 22, pt. 5, 1893 (9 pp. of reprint).

1895.

Anon. [not signed]. Derbyshire.

A Field Meeting [at Matlock Bath; Report of Excursion of Liverpool Geol. Assn.]. Journ. Liv. Geol. Assn., Vol. 25, 1894-5, pp. 17-18.

Anon. [not signed]. York Mid W.

A Field Meeting [held at Clapham; Report of Excursion of Liverpool Geol. Assn. to Ingleborough Caves, etc.]. Journ. Liv. Geol. Assn., Vol. 25, 1894-5, p. 19.

Anon. [not signed]. Lanc. S., Cheshire.

The Field Meeting [of the Liverpool Geol. Assn. to the Birkenhead neighbourhood; cores from local bores, and slabs, with footprints, from the Storeton Quarries, examined]. Journ. Liv. Geol. Assn., Vol. 25, 1894-5, pp. 30-31.

Anon. [not signed]. Isle of Man.

An Auriferous Quartz-vein . . [near Douglas, Isle of Man; first record of gold from the island]. Nature, 24th Jan. 1895, p. 299.

Anon. [not signed]. York S.E.

East Riding Antiquarian Society. The Danes' Graves [Report of Meeting at Driffield]. N. and E. Yorks. Science Notes, Dec. 1895, pp. 65-66.

Anon. [not signed]. York Mid W.

"Gaping Ghyll" [note of Martel's Exploration]. Nat. Journ., Sep. 1895, p. 202.

Anon. [not signed]. York N.E.

Geological Excursion to Saltersgate and Winny Nab [Brief Notes on an Excursion organised and conducted by the Rev. E. M. Cole]. Naturalist Notes, Vol. 1, 1894-5, p. 27.

Anon. [not signed]. All the Northern Counties.

Geological Literature | added to the | Geological Society's Library | during the | half year ended December 1894 | . . . | . . . | London | 1895 | . . . . [58 pp. Contains numerous references to papers bearing on the geology of the northern counties].

Anon. [not signed]. Isle of Man.

Gold in the Isle of Man [a paying vein found at Douglas]. Nat. Journ., Feb. 1895, p. 38.

ANON. [not signed]. YORK N.E. AND S.E.
Historical Note on Malton Spa [shows that the Chalybeate waters of Malton have been known for a considerable time; brief geological notes]. Naturalist Notes, Vol. 1, 1894-5, pp. 48-49.

ANON. [not signed]. YORK N.E. AND S.E.
Important Excavations at Malton [in connection with the North Eastern Railway extensions; several British tumuli unearthed, etc.]. Naturalist Notes, Vol. 1, 1894-5, pp. 63-65.

ANON. [not signed]. YORK N.E., LANC. S., ETC.
In Memoriam. William Crawford Williamson, LL.D., F.R.S., &c. Born 24th Nov. 1816. Died 23rd June 1896 [should be 23rd June 1895; contains numerous references to Prof. Williamson's geological work in the north of England; and a list of 'Memoirs and Papers by the late Dr. W. Crawford Williamson, F.R.S., etc.']. Proc. Yorks. Geol. and Polytec. Soc., 1895, pp. 95-111, with portrait plate.

ANON. [not signed]. YORK N.E. AND S.E.
Malton Naturalists' Society. Presentation to Mr. S. Chadwick [on his departure to New Zealand; references made to the geological specimens got together by Mr. Chadwick in the Malton Museum]. N. and E. Yorks. Science Notes, Sept. 1895, pp. 25-29.

ANON. [not signed]. CHESHIRE.
North Staffordshire Naturalists' Field Club [visiting Marston Mine and the Cheshire Salt-beds, 4th May 1895, led by C. E. De Rance; detailed account of the district]. Sci. Goss., June 1895, p. 111.

ANON. [not signed]. YORK N.E., LANC. S. AND S.W,
Professor William C. Williamson, LL.D., F.R.S. [Obituary notice; his work in Yorkshire aud Lancashire referred to]. Geol. Mag., Aug. 1895, pp. 383-384.

ANON. [not signed]. YORK MID W., N.E., S.E., N.W., S.W.
Reports of Field Excursions [of the Leeds Geological Association; to Ripon, on 1st July 1893, New Red Sandstone, Magnesian Limestone, etc., and Glacial beds; to Marsh Lane Cutting, Leeds, on 8th July, sections in the Coal Measures; to Kirkby Moorside, on 10th July, with the Yorkshire Naturalists' Union, sections in the Oolites, Glacial beds, etc.; to Bolton and Eastby, on 15th July, Carboniferous Limestone, Millstone Grit, etc.; to Gisburn and Sawley Abbey, with Y.N.U., on 7th August, Carboniferous Limestone, Millstone Grit, etc.; to Wetherby, on 12th August, Carboniferous and Magnesian Limestones, Glacial beds, etc.; to Rombald's Moor, on 2nd September, Millstone Grit and Glacials; to Pocklington, with Y.N.U., on 7th September, Chalk and Lias; Marsh Lane Cutting, on 21st April 1894, Coal Measures; to Sedbergh, with Y.N.U., on 14th May, Carboniferous basement beds, etc.; to Ferrybridge, with Y.N.U., on 16th June, Magnesian Limestone and Millstone Grit]. Trans. Leeds Geol. Assn., Part 9, 1893-94, publ. 1895, pp. 65-83.

ANON. [not signed]. YORKSHIRE, ISLE OF MAN.
Review. The Geological Survey [Report for 1894; briefly refers to the work done by the Survey in the Isle of Man, Yorkshire, etc.]. Geol. Mag., Dec. 1895, pp. 567-569.

ANON. [not signed]. YORK S.E. AND N.E.
The Inhabitants of Yorkshire in Pre-Roman Times [describing various weapons, etc., from the tumuli on the Wolds]. Naturalist Notes, Vol. 1, 1894-5, pp. 58-60.

ANON. [not signed]. LANC. S.
The Lancashire Coalfield. Coll. Guard., Vol. 69, 1895, pp. 592 et seq.

ANON. [not signed]. YORK MID W. AND S.W.
The Yorkshire Coalfield. Coll. Guard., Vol. 69, 1895, pp. 17, 64, 113, 159, 207, 255, 304, 353, 400, 448, 1029 et seq.

ANON. [not signed]. YORK S.E.
Yorkshire Naturalists' Union [at Flambro'; geological notes]. North and East Yorks. Science Notes, July 1895, pp. 11-12.

ANON. [not signed; query P. F. Kendall, Editor]. LANCS., CHESHIRE.
Current Glacial Bibliography. Geological Magazine, New Series, Decade iv., Vol. 1, January-December 1894 [summarising papers bearing on Glacial Geology; some of which refer to the northern counties]. Glac. Mag., Jan. 1895, pp. 123-126, and Feb., pp. 134-139.

ANON. [not signed; query P. F. Kendall, Editor]. LAKE DISTRICT, ETC.
Current Glacial Bibliography. Geological Magazine, Decade IV., Vol. II., January-December, 1895 [includes abstract of a paper on 'Physiographical Studies in Lakeland,' by J. E. Marr, etc.]. Glac. Mag., Dec. 1895, pp. 152-159.

ANON. [not signed; query P. F. Kendall, Editor]. LANC. S., CHESHIRE.
Current Glacial Bibliography. Proceedings of the Liverpool Geological Society. Session 1894-95, Part 3, Vol. VII. [Gives abstracts of numerous papers bearing on the geology of the Liverpool neighbourhood]. Glac. Mag., Dec. 1895, pp. 159-162.

ANON. [not signed; query P. F. Kendall, Editor]. YORK S.E.
Current Glacial Bibliography. Proc. Yorkshire Geol. and Polytechnic Soc. N.S., Vol. III., Part 5, pp. 347-475, 1894 [gives abstract of paper on 'Some New Sections in the Hessle Gravels,' by F. Fielder Walton]. Glac. Mag., Dec. 1895, pp. 162-3.

ANON. [not signed; query P. F. Kendall, Editor]. LAKE DISTRICT, ISLE OF MAN.
Current Glacial Bibliography. Quarterly Journal of the Geological Society, Vol. LI., part 3, August 1st, 1895 [contains abstracts of papers on 'An Experiment to Illustrate the Mode of Flow of a Viscous Fluid,' by Prof. W. J. Sollas (refers to the Isle of Man); 'Notes on some Railway Cuttings near Keswick,' by J. Postlethwaite, etc.]. Glac. Mag., Sept. 1895, pp. 99-104.

ANON. [not signed; query P. F. Kendall, Editor]. LAKE DISTRICT.
Current Glacial Bibliography. The Geographical Journal, Vol. vi., No. 2, August 1895. [Contains a lengthy summary of Dr. Hugh Robert Mill's paper on a 'Bathymetrical Survey of the English Lakes,' Wastwater, Coniston Water, Hawes Water, Ullswater and Windermere]. Glac. Mag., Sept. 1895, pp. 105-106.

ANON. [not signed; query P. F. Kendall, Editor]. LANC. S., ETC.
Glacial Geology at the British Association [abstracts of papers given, some of which very briefly refer to the northern counties]. Glac. Mag., Sep. 1895, pp. 94-99.

ANON. [not signed; query P. F. Kendall, Editor]. 'YORK.'
Meeting of the Glacialists' Association [at York; briefly describes an excursion on the moraines around York, which were laid down by the Vale of York glacier]. Glac. Mag., June 1895, pp. 41-43.

J. B. ATKINSON. ALL THE NORTHERN COUNTIES.
Home Department. Mineral Statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the year 1894. London. 1895 **[not seen].**

J. B. ATKINSON. ALL THE NORTHERN COUNTIES.

Mines. List of Mines in the United Kingdom of Great Britain and Ireland, and the Isle of Man, for the year 1894, prepared by Her Majesty's Inspectors of Mines. London. 1895 **[not seen].**

J. F. BLAKE. ALL THE NORTHERN COUNTIES.

Annals of British Geology, 1893. A digest of the Books and Papers published during the year; with an Introductory Review; pp. xxiv. + 365 (illustrations). London. 1895.

HERBERT BOLTON. LANC. S.

Note on some Fossil Trees at Doulton's Delf, St. Helens, Lancashire [describes several erect tree trunks and the remains of vegetation, which occur in a bed of Coal Measure shale; discussion by various gentlemen also printed]. Trans. Manch. Geol. Soc., Vol. 23, pt. 3, 1895, pp. 73-80.

H. BOLTON. CUMBERLAND, ISLE OF MAN.

On the Metamorphism of Coal [briefly refers (p. 129) to the graphite from Borrowdale, Cumberland, and Beary, Isle of Man; discussion by various gentlemen also printed]. Trans. Manch. Geol. Soc., Vol. 23, pt. 5, 1895, pp. 122-144.

HERBERT BOLTON. LANC. S. AND W.

The Geology of North-East Lancashire in its relation to the Physical Geography [describes in some detail the various beds exposed in North-East Lancashire, and refers to the various changes in the physical features of the district as shown by a careful study of the structure and contents of the beds]. Trans. Manch. Geol. Soc., Vol. 24, pts. 3 and 4, 1895, pp. 56-67.

T. G. BONNEY. YORK S.E., LINC. N. AND S.

Supplementary Note on the Narborough District (Leicestershire) [thinks that the pebbles of chalk and flint in the boulder clay at Narborough probably came from Yorkshire or Lincolnshire; but in a footnote adds that the chalk is not from the northern part of Yorkshire (i.e. Flamborough)]. Quart. Journ. Geol. Soc., Vol. 51, pt. 1, Feb. 1895, pp. 24-34.

HARWOOD BRIERLEY. YORK S.E.

The Yorkshire Gypsey-Springs [at Wold Newton; described at length]. Nature, 26th Dec. 1895, p. 177.

A. J. JUKES-BROWNE. See under 'Jukes-Browne.'

MONTAGU BROWNE. NOTTS.

Preliminary Notice of an Exposure of Rhætic Beds, near East Leake, Nottinghamshire (Fourth Contribution to Rhætic Geology) [describing a section exposed during the construction of the Manchester, Sheffield, and Lincolnshire Railway; list of fossils given]. Rep. Brit. Assn., 1895, pp. 688-690.

F. M. BURTON. LINC. N. AND S.

The Story of the Lincoln Gap [gives a detailed account of the geological features of the district, and points out the former courses of the Trent, Witham, etc.]. Nat., Sept. 1895, pp. 273-280.

F. M. BURTON. LINCOLNSHIRE.

Lincolnshire Naturalists at Sleaford [Geology]. Nat., Nov. 1895, pp. 313-314.

F. M. BURTON. LINC. N. AND S.

Lincolnshire Geology [contains a list of papers relating to the geology of the county published between 1819 and 1893]. Trans. Linc. Nat. Union, Vol. 1, 1895, pp. 19-23.

F. M. BURTON. LINC. N.

Address to the Lincolnshire Naturalists' Union, Grimsby, 1894. How the land between Gainsborough and Lincoln was formed [describes the various strata, and points out the probable conditions under which they were deposited, etc.]. Trans. Linc. Nat. Union, Vol. 1, pp. 33-44 [not numbered].

J. BURTON. YORK S.W

[Boulders at] Millwood, Todmorden [Mirfield; and Horbury; in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, pp. 340-341.

F. T. P. VAN CALKER. NORTH EASTERN COUNTIES.

A Scheme for Perfecting the Determination of Boulders [suggests the formation of an International Committee to examine and report upon the petrological characters of the erratics, etc., the result to be published in a monthly magazine]. Glac. Mag., Dec. 1895, pp. 132-138.

FREDK. O. PICKARD-CAMBRIDGE. LAKE DISTRICT.

[Geology of Lake District briefly summarised in the introduction to] A List of the Araneidea of Cumberland and the Lake District. Nat., Jan. 1895, p. 32.

T. CROSBEE CANTRILL. CUMBERLAND, YORK MID W. AND S.W.

On the Occurrence of Spirorbis-limestone and thin Coals in the so-called Permian Rocks of Wyre Forest; with Considerations as to the Systematic Position of the 'Permians' of Salopian Type [compared with the rocks of the Cumberland and Yorkshire Coalfields]. Quart. Journ. Geol. Soc., Vol. 51, Part 3, Aug. 1895, pp. 528-548.

JOHN T. CARRINGTON. CUMBERLAND, YORK S.W.

Mineralogy [describing a visit to Thomas D. Russell's collection, and mentioning some Calcites and other minerals from Cumberland, Cleator Moor, etc., and 'peacock' coal from Barnsley]. Sci. Goss., Sept. 1895, p. 176.

W. L. CARTER. YORK S.W.

[Geology observed by the] Yorkshire Naturalists' Union at Ferry-bridge. Nat., April 1895, p. 111.

W. LOWER CARTER. YORK MID W., N.E., S.E.

"A Peep into Nature's Sculpture Gallery" [briefly refers to the plane of marine denudation in North-West Yorkshire, and the erosion of the Yorkshire coast]. Trans. Leeds Geol. Assn., Part 9, 1893-94, publ. 1895, pp. 12-17.

D. CLAGUE. ISLE OF MAN.

Further Notes on the Geology of the Isle of Man [gives a detailed account under the heads of Palæozoic, Mesozoic, and Cainozoic]. Journ. Liverp. Geol. Assn., Vol. 15, 1894-5, pp. 19-29.

EDWARD CLODD. YORK S.E., ETC.

The Story of | "Primitive Man" | by | Edward Clodd | . . | . . | . . | . . | London . . | . . | 1895. [206 pp. Several East Yorkshire implements, etc., figured and described.]

C. T. CLOUGH. See 'W. Gunn.'

E. MAULE COLE. YORK N.E.

The Yorkshire Naturalists' Union at the Hole of Horcum [Geology]. Nat., July 1895, pp. 211-212.

E. B. COLLINSON [not signed]. YORK N.E.

A Natural History Excursion to Coxwold [6th Sept. 1895; notes on the occurrence of *Terebratulæ*, *Rhynconella thurmanni*, Belemnites, Trigonias, Encrinites, and *Gryphæa incurva* in quarries at the top end of the village]. Nat. Hist. Journ., 15th Oct. 1895, p. 103.

T. R. CONNELL. LANC. S., CHESHIRE.

Our Work [a Review of the work done at the Meetings and Excursions of the Liverpool Geological Association, Session 1894-5]. Journ. Liverpool Geol. Assn., Vol. 25, 1894-5, pp. 5-8.

JOHN CORDEAUX. LINC. N. AND S.

Address to the Lincolnshire Naturalists' Union, Delivered at Lincoln, May 24th, 1894 [refers to the geology of the county at some length, and suggests the formation of a Boulder Committee]. Trans. Linc. Nat. Union, Vol. 1, 1895, pp. 1-12.

G. C. CRICK. YORK MID W., ISLE OF MAN.

On a New Species of *Prolecanites* from the Carboniferous Lime-stone of Haw Bank Tunnel, Skipton, Yorkshire [describes and figures a new species of *Prolecanites*, designated *P. similis*, found and presented to the Manchester Museum by Rev. E. Jones; compared with *P. ceratitoides* from Nassau, and *P. compressus* from the Isle of Man, both of which are also figured; discussion by various gentlemen printed]. Trans. Manch. Geol. Soc., Vol. 23, Part 3, 1895, pp. 80-88.

ELIZABETH DALE. DERBYSHIRE.

Further Notes on the Glaciation of the Neighbourhood of Buxton [describes the boulders in the Goyt Valley, etc., some of which have come from the Lake District]. Glac. Mag., Dec. 1895, pp. 122-124.

T. W. DAVIES AND T. MELLARD READE. CHESHIRE.

Description of the Strata exposed during the construction of the Seacombe branch of the Wirral Railway [Sections in the Trias and Glacial beds exposed, surfaces of the former being frequently striated; lists of shells and foraminifera given]. Proc. Liverp. Geol. Soc., Vol. 7, Part 3, 1894-5, pp. 326-348, and 2 plates; abstract in Glac. Mag., Dec. 1895, pp. 161-162.

W. M. DAVIS. LINC. N. AND S., YORK S.W. AND S.E.

On the Development of Certain English Rivers [refers to the Trent, Humber, etc.]. Geog. Journ., Feb. 1895, pp. 127 et seq. **[not seen].**

[W.] BOYD DAWKINS. ISLE OF MAN.

The Geology of the Isle of Man. Part II. [dealt with under the heads of (1) Introductory; (2) the Continuation of the Boring at Ballawhane; (3) the Triassic Sandstones; (4) the Upper Permians of the Stack Series; (5) the Carboniferous Limestone; (6) the Evidence of a Fault; (7) the Dip of the Rocks and the Two Geological Breaks; and (8) the Practical Results of the Borings; discussion by various gentlemen also printed]. Trans. Manch. Geol. Soc., Vol. 23, Part 6, 1895, pp. 147-159, with Section v. 'Lhen Moar—Point of Ayre'; also Coll. Guard., Vol. 69, 1895, pp. 416 et seq.

C. E. DERANCE [Secretary]. ALL THE NORTHERN COUNTIES.

The Rate of Erosion of the Sea-Coasts of England and Wales, and the Influence of the Artificial Abstraction of Shingle or other material in that action. Fourth Report of the Committee . . . . . [Includes particulars of the erosion in the 'Estuary of the Humber' (p. 377), by C. Fox-Strangways; 'Northumberland, Durham, Cumberland, and Westmorland' (p. 377), by Lieut.-Col. Melville; 'Hoylake to Birkenhead, Cheshire,' 'Liverpool to Lytham,' and 'Lytham to Fleetwood' (pp. 378-381), by C. E. DeRance; 'Erosion of the Yorkshire Coast,' by Captain A. H. Kenney; 'Erosion of Coast of Lancashire since 6-inch Survey, 23rd July 1892,' by Captain A. D. Meeres; also (Appendix iv.) Second Chronological List of Works on the Coast-Changes and Shore-Deposits of England and Wales, by W. Whitaker (pp. 388-392)]. Rep. Brit. Assn., 1895, pp. 352-392.

CHAS. E. DERANCE.

On Glacial Theories, Past and Present, and their Application to Staffordshire **[not seen].** Ann. Rep. and Trans. N. Staffs. N.F. Club, Vol. 29, for 1894-95, publ. 1895, pp. 107-128.

JOSEPH DICKENSON [not signed]. LANC. S.

The Permian Marls [Mr. Dickenson exhibited and described a piece of Permian Marl obtained in situ from the corner of Egerton Street, Manchester, which proved that the Permian Marls extended about a mile further south than had been mapped by the Geological Survey]. Trans. Manch. Geol. Soc., Vol. 23, Part 8, 1895, pp. 189-190.

E. DICKSON. LANC. S.

Notes on the Geology of the Country between Preston and Blackburn [describes the Glacial, Triassic, Permian, and Carboniferous beds at some length; and also refers to the numerous faults which pass through the district; with plate showing the 'present and Pre-Glacial channels of the river Darwen']. Proc. Liverpool Geol. Soc., Vol. 7, Part 3, 1894-5, pp. 276-288.

E. DICKSON. LANC. S.

Further Notes on the Section at Skillaw Clough, near Parbold [the rocks met with are Magnesian limestone, red-purple marls and shales, soft red and brown sandstone, and grey and purple shales and grits (Millstone Grit)]. Proc. Liverp. Geol. Soc., Vol. 7, pt. 3, 1894-5, pp. 314-320 (sections).

E. DICKSON [not signed]. LANC. S., CHESHIRE.

President's Address. Chemistry as an Aid to Geology [the chemical constituents of some of the local rocks referred to]. Proc. Liverp. Geol. Soc., Vol. 7, pt. 3, 1894-5, pp. 243-270.

NORTHUMBERLAND, YORK MID W., CUMBERLAND,
MISS JANE DONALD. WESTMORLAND, LANC. S.

Notes on the Genus Murchisonia and its Allies; with a Revision of the British Carboniferous Species, and Descriptions of some New Forms [describing and figuring *M. dispar* from Lowick, *M. fusiformis* from Bolland, *M. marri* (sp. n.) from Shap, *M. fastigiata* (sp. n.) from Clattering Ford, Cumberland, *M. m'coyi* (sp. n.) from Widdale Fell, Wensleydale, *M. oweni* (sp. n.) from Todmorden, and *M. tabulata* from Slaidburn and Kendal; all from the Carboniferous]. Quart. Journ. Geol. Soc., May 1895, pp. 210-234, plates 8-10; abstract in Geol. Mag., 1895, pp. 185-186.

W. L. H. DUCKWORTH AND F. E. SWAINSON. NOTTINGHAMSHIRE.

A New Ossiferous Fissure in Cresswell Crags [abstract only; at the top is a white earth with human and other remains, and this passes down into a red sand with remains of fox, badger, roe-deer, etc.]. Quart. Journ. Geol. Soc., May 1895, p. 237; abstract in Geol. Mag., April 1895, p. 186.

A. R. D[WERRYHOUSE]. NORTH-EASTERN COUNTIES, ETC.

Current Glacial Bibliography. Nature, Vol. LX. [abstracts the papers and notes bearing upon Glacial Geology; some of which refer to the northern counties]. Glac. Mag., March 1895, pp. 159-162.

A. R. D[WERRYHOUSE]. LAKE DISTRICT.

Current Glacial Bibliography. The Geographical Journal, Vol. IV. [contains summary of Hugh Robert Mill's paper on 'A Survey of the English Lakes,' etc.]. Glac. Mag., June 1895, p. 29-33.

ARTHUR R. DWERRYHOUSE. CHESHIRE.

Notes on the Glacial Deposits on the Cheshire Shore of the Dee Estuary [describes the glacial beds exposed in the Cliff sections, etc.,

and their contents; the boulder clays are attributed to the direct action of an ice-sheet, and the gravels and sands to the sub-glacial drainage system]. Glac. Mag., March 1895, pp. 150-157 (and plate).

A. R. DWERRYHOUSE. CHESHIRE.

Note on a Striated Surface at Little Mollington, Cheshire [describes striæ running from 5°-10° W. of N. (true) on the Pebble Beds]. Glac. Mag., Feb. 1895, p. 146.

A. R. DWERRYHOUSE. LANCASHIRE, CHESHIRE, LAKE DISTRICT, ISLE OF MAN.

On the Glacial Deposits in the Neighbourhood of the Wrekin [briefly refers to the drifts and boulders of the counties bordering the Irish Sea]. Glac. Mag., June 1895, pp. 49-66.

A. R. DWERRYHOUSE. ISLE OF MAN.

On a Terminal Curvature in the Isle of Man [in the Ordovician Slates on the Cliffs above Bulghan Bay; attributed to ice-movement from the north]. Glac, Mag., March 1895, pp. 164-165.

[MISSES] G. L. ELLES AND E. M. R. WOOD. CUMBERLAND.

Supplementary Notes on the Drygill Shales [near Carrock Fell; giving an enlarged list of fossils, confirming the correlation of the group with the Coniston Limestone, and dividing it into two parts, an upper with abundant *Trinucleus* and a lower with abundant *Ampyx* and *Orthis testudinaria*]. Geol. Mag., June 1895, pp. 246-249.

ARTHUR H. FOORD. YORK N.E.

A Short Account of the Ammonites and their Allies, as Exhibited in the Cephalopod Gallery of the British Museum (Natural History) [refers to the well-preserved ammonites in the '*Serpentinus* zone,' or Jet Rock, of the Yorkshire lias]. Geol. Mag., Sept. 1895. p. 391-400.

C. LE NEVE FOSTER. ISLE OF MAN, ETC.

Report of H.M. Inspector of Mines for the North Wales, &c., and Isle of Man district (No. 9), to Her Majesty's Secretary of State . . . For the year 1894. London, 1895 **[not seen].**

J. G. GARSON. ? NORTHERN COUNTIES.

Early British Races. Proc. Roy. Inst. Gt. Britain, Vol. 14, 1895, p. 248 et seq. **[not seen].**

E. J. GARWOOD AND J. E. MARR. NORTHERN COUNTIES.

Zonal Divisions of the Carboniferous System [the following zones are shown as being represented in the Lower Carboniferous beds of the northern part of the Pennine Chain:—Zone of *Productus edelburgensis*, zone of *Productus latissimus*, zone of *Productus giganteus*, zone of *Chonetes papilionacea*, and zone of *Spirifera octoplicata*; the authors suggest the formation of a committee to work out the zones of the Carboniferous]. Rep. Brit. Assn., 1895, p. 696; and Geol. Mag., Dec. 1895, pp. 550-552.

EDMUND J. GARWOOD. CHEVIOTLAND.

[Geology in] A History of Northumberland, issued under the direction of the Northumberland County History Committee. Vol. ii. [with account of the geology of Embleton Parish, Ellingham, Howick, Long Houghton, and Lesbury; Appendix I., continuation of bibliography; II., sections of coal-workings in the Mountain Limestone formation; III.-V., plates of geological sections, showing the relations of the Whin Sill, etc.]. 4to., pp. x. + 570; Newcastle-on-Tyne. Reviewed by G. A. Lebour in Geol. Mag., Nov. 1895, pp. 519-520.

REGINALD A. GATTY. LANC. S.

Pigmy Flints [describes and figures some small worked flints, up to half an inch in length, found on the fields in East Lancashire]. Sci. Goss., April 1895, pp. 36-37.

ARCHIBALD GEIKIE. — CUMBERLAND, ISLE OF MAN, YORK MID W. AND S.W., LANCASHIRE.

Annual Report of the Geological Survey . . . for . . . 1894 [with notes on the Skiddaw Slates of the Isle of Man and their crush-conglomerates; the Millstone Grit of the Keighley district; the pre-Permian and post-Permian faults of the Whitehaven district; and the drifts, insular and extra-insular, of the Isle of Man]. Pp. 267-300 of 42nd Rep. Departm. Sci. and Art, 1895.

JAMES GEIKIE. — ALL THE NORTHERN COUNTIES.

The Classification of European Glacial Deposits. Journ. Geol. Chicago, Vol. 3, 1895, pp. 241 et seq.

GEOLOGICAL SURVEY OF ENGLAND AND WALES. — LAKE DISTRICT.

One-inch Map. New Series. Sheet 24. Penrith (Solid and Drift). 1895.

One-inch. New Series. Sheet 30. Appleby (Solid and Drift). 1895.

One-inch. New Series. Sheet 31. Brough under Stainmoor (Solid and Drift). 1895.

GEOLOGICAL SURVEY OF ENGLAND AND WALES. — LINCOLNSHIRE.

General Geological Map of England and Wales (4 miles to an inch), hand-coloured edition, Sheet 9 (Lincolnshire). 1895.

GEOLOGICAL SURVEY OF ENGLAND AND WALES. — NORTHUMB., CUMB.

Geological Map of England and Wales (one inch to a mile), Quarter-sheets 101 N.W. and S.W. (Whitehaven Coalfield) and 109 S.W. (Drifts of part of Northumberland), new editions. 1895.

J. W. GREGORY. — YORK N.E.

A Revision of the Jurassic Bryozoa.—Part i. The Genus *Stomatopora* [including notices of *St. smithi* Phillips, Cornbrash, near Scarborough, only the type specimen known]. Ann. and Mag. Nat. Hist., March 1895, p. 226.

W. GREGSON. — YORK N.W.

[Boulders at] Rokeby Park [in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, p. 342.

W. S. GRESLEY. — YORK S.W., DERBYSHIRE, NOTTS., LINC. S.

On the Eastern Limits of the Yorkshire and Derbyshire or Midland Coalfield [abstract only; inferring that an anticlinal in the Carboniferous rocks probably underlies that in the secondary rocks near the southern end of the Lincolnshire Wolds]. Quart. Journ. Geol. Soc., May 1895, p. 98.

W. GUNN and C. T. CLOUGH. — CHEVIOTLAND.

The Geology of Part of Northumberland, including the country between Woolmer and Coldstream [giving an account of the andesitic lavas ('porphyrites') of the Lower Old Red Sandstone, with petrographical notes by W. W. Watts; a detailed description of the carboniferous rocks of the district; the intrusive igneous rocks, faults, and veins; and the Glacial and Post-Glacial deposits; while two appendices give lists of fossils and a bibliography]. Mem. Geol. Surv. England and Wales, Expl. of Quarter-sheet 110 S.W. (New Ser., Sheet 3), 1895, pp. vi. + 97.

ALFRED HARKER. — LAKE DISTRICT.

Carrock Fell: a Study in the Variation of Igneous Rock-Masses. Part II. The Carrock Fell Granophyre. Part III. The Grainsgill Greisen [describing the granophyre and especially a basic modification along its southern edge, referred to an incorporation of portions of the adjacent gabbro; describing also the greisen of Grainsgill as a peculiar modification of the Skiddaw granite]. Quart. Journ. Geol. Soc., May 1895, pp. 125-147 and pl. iv.; abstract in Geol. Mag., March 1895, p. 139.

ALFRED HARKER. ALL THE NORTHERN COUNTIES.

. . . | **Petrology for Students: | an Introduction to the Study** of Rocks | under the Microscope. | by | Alfred Harker, M.A., F.G.S., | . . . | . . . | . . . Cambridge | . . . | 1895 | . . . | [with descriptions of many North Country rocks, igneous and sedimentary]. 8vo, pp. viii. + 306.

ALFRED HARKER. DURHAM.

Some Metasomatic Changes in Limestones [the Magnesian Limestones of Durham referred to]. Sci. Progress, Vol. 4, 1895, p. 50 et seq.

S. N. HARRISON. ISLE OF MAN.

Report of the Geological Section (C.) [Isle of Man]. Yn Lioar Manninagh, Vol. 3, 1895, pp. 21 et seq.

S. N. HARRISON. ISLE OF MAN.

Address [Glacial Geology, etc., of the Isle of Man]. Yn Lioar Manninagh, Vol. 3, 1895, p. 27 et seq.

W. JEROME HARRISON. ALL THE NORTHERN COUNTIES.

A Bibliography of Midland Glaciology [contains titles and summaries of over 250 books and papers, several of which have reference to the northern counties]. Proc. Birmingham Nat. Hist. and Phil. Soc., Vol. 9, pt. 2, 1895 [reprint of 86 pp.].

W. JEROME HARRISON. YORK N.E. AND S.E.

Notes on the Glacial Geology of the Yorkshire Coast (chiefly near Whitby) [describes in detail the glacial beds exposed in the cliff sections, and compares them with similar beds in Lancashire and Cheshire and the Midlands; with Appendix, a 'List of the more important Books and Papers relating to the Glaciology of the Yorkshire Coast' (with summaries and abstracts)]. Glac. Mag., Sept. 1895, pp. 67-89 and two views of the cliffs, from photographs.

E. HAWKESWORTH. YORK N.E.

[Boulders at] Saltburn [in 'The Yorkshire Boulder Committee and its Ninth Year's Work]. Nat., Dec. 1895, p. 343.

W. A. HERDMAN [Secretary]. ISLE OF MAN.

The Marine Zoology, Botany, and Geology of the Irish Sea. Third Report of the Committee . . . . [Deposits are met with on the floor of the Irish Sea which are not the waste of the land, and some of them bear resemblances to the Coralline Crag]. Rep. Brit. Assn., 1895, pp. 455-467.

THOS. HICK. YORK S.W., ETC.

On Some Recent Advances in British Palæobotany [reviews the progress recently made in the study of *Calamites*, *Sphenophyllum*, *Kaloxylon hookeri*, *Lyginodendron* and *Heterangium*, *Lepidodendron* and Allied Forms, *Myeloxylon* and other Coal-Measure forms, several of which are from the Yorkshire beds]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 43-57.

THOMAS HICK. YORK S.W.

On the Structure of the Leaves of *Calamites* [describes and figures specimens from Halifax, from the collection of Messrs. Wm. Cash and James Binns, of Halifax, and James Lomax, of Radcliffe]. Mem. and Proc. Manch. Lit. and Phil. Soc., Session 1894-5, pp. 179-190, with plate.

THOMAS HICK. YORK S.W., LANC. S.

On *Kaloxylon Hookeri*, Will. and *Lyginodendron Oldhamium*, Will. [bases his conclusions on specimens in the Cash Collection, Owens College; query, from Halifax]. Mem. and Proc. Manch. Lit. and Phil. Soc., Session 1894-5, pp. 109-117, with plate.

E. Hill. York N.E. and S.E., Linc. N. and S.

Observations on East Anglian Boulder Clay [considers the Boulder Clays of East Anglia to have been formed in water]. Geol. Mag., Dec. 1895, pp. 555-557.

W. Hill and A. J. Jukes-Browne. York S.E., Linc. N.

On the Occurrence of Radiolaria in Chalk [refers principally to the South of England; the authors have recognised calcitic replacements of Radiolaria in the chalk at several localities in Lincolnshire and Yorkshire]. Quart. Journ. Geol. Soc., Vol. 51, Part 4, Nov. 1895, pp. 600-608 with plate; abstract in Geol. Mag., Aug. 1895, p. 372.

Wheelton Hind. Lanc. S., Northumb. S.

A Monograph on Carbonicola, Anthracomya, and Naiadites: Part II., pp. 81-170, Pl. XII.-XX. [describing and figuring numerous species of *Anthracomya* from the Lancashire and Newcastle Coalfields]. Palæontograph. Soc., Vol. xlix., 1895.

G. J. H[inde]. All the Northern Counties.

[Review of] The Great Ice Age and its relation to the Antiquity of Man. By James Geikie, LL.D., D.C.L., F.R.S., etc. [refers to the Glacial, etc., deposits of Yorkshire, Lincolnshire, etc.]. Geol. Mag., Jan. 1895, pp. 29-38.

K. A. Hinde and G. L. Pepler. York N.E.

[Fossils found at Coxwold, *Rhynconella thurmanni* and *Pecten *fibrosus*, and at the Fulford gravel-pits, *Gryphæa incurva* and *Strophomena depressa*]. Nat. Hist. Journal, 15th Dec. 1895, p. 148.

Bernard Hobson. Lanc. S., Durham.

Notes on a Specimen of Permian Limestone from Skillaw Clough [a microscopical description and chemical analysis, compared with a sample of Magnesian Limestone from Roker in Durham]. Proc. Liverp. Geol. Soc., Vol. 7, pt. 3, pp. 320-322.

H. H. Howorth. York S.E.

Mr. Deeley and Mr. Harker: "Two Birds with One Stone" [adhering to his opinion that the Norwegian boulders in Holderness have been artificially transported]. Geol. Mag., Jan. 1895, pp. 46-48.

Wilfrid H. Hudleston. Linc. N. and S., York N.W.

A Monograph of the Inferior Oolite Gasteropoda: Part 8, pp. 391-444, pl. 33-40 [describing and figuring several species of *Pleurotomaria* found in the Lincolnshire Limestone at Lincoln, etc., and one near *P. subaraneosa* (sp. nov.) from the Yorkshire Dogger]. Palæontograph. Soc., Vol. xlix., 1895.

Edward Hull. Lanc. S. and W., Cheshire, etc.

The Glacial Deposits of Aberdeenshire [criticising a paper by Mr. Dugald Bell in a previous issue; compares with the drifts of Lancashire, Cheshire, etc.]. Geol. Mag., Oct. 1895, pp. 450-452.

W. Maynard Hutchings. Lake District.

Note on a Contact-Rock from Shap [from the slope of Wasdale Pike; gives results of microscopical and chemical examination; and compares with a rock from Frederiksvärn]. Geol. Mag., July 1895, pp. 314-317.

W. Maynard Hutchings. York N.W.

An Interesting Contact-Rock, with Notes on Contact-Meta-morphism [describing especially the alteration of the carboniferous strata by the Whin Sill at Falcon Clints in Teesdale]. Geol. Mag., March-April 1895, pp. 122-131, 163-169.

W. Maynard Hutchings. See 'C. A. McMahon.'

OSMUND W. JEFFS [Secretary]. YORKSHIRE, LANCASHIRE.

Photographs of Geological Interest in the United Kingdom. Sixth Report of the Committee . . . [161 photos added to the collection, 42 of which are from Yorkshire, and one from Lancashire]. Rep. Brit. Assn., 1895, pp. 404-414.

S. J[ENKINSON]. YORK N.E.

Along the Cliffs from Hayburn Wyke to Robin Hood's Bay [Geological notes]. N. and E. Yorks. Science Notes, Oct. 1895, pp. 37-38.

T. RUPERT JONES AND HENRY WOODWARD. WESTMORLAND.

On Some Palæozoic Phyllopoda [describes *Pinnocaris lapworthi* from the Upper Silurian of Kendal]. Geol. Mag., Dec. 1895, p. 539-545.

T. RUPERT JONES AND JAMES W. KIRKBY. YORKSHIRE.

Notes on Palæozoic Bivalved Entomostraca. No. XXXII. Some Carboniferous Ostracoda from Yorkshire **[not seen].** Ann. and Mag. Nat. Hist., Vol. 16, 1895, pp. 452 et seq.

T. RUPERT JONES [Secretary]. ALL THE NORTHERN COUNTIES.

The Fossil Phyllopoda of the Palæozoic Rocks.—Twelfth Report of the Committee . . . [Several specimens from the north of England enumerated]. Rep. Brit. Assn., 1895, pp. 416-426.

J. B. JORDAN. ALL THE NORTHERN COUNTIES.

Home Department. - Mines. List of the Plans of abandoned Mines deposited in the Home Office under the Coal and Metalliferous Mines Regulations Acts, including Plans transferred from the late 'Mining Record Office,' corrected to the 31st December 1894. London, 1895 **[not seen].**

A. J. JUKES-BROWN[E]. LINC. N. AND S.

A Sketch Map of the Soils of Lincolnshire [coloured, distinguishing 'Alluvium, Peat and Fen Soils,' 'Clay Soils,' 'Gravel and Sand Soils,' 'Chalky Soils,' and 'Limestone Soils"; also showing Natural History Divisions by Rev. E. Adrian Woodruffe-Peacock]. Nat., Oct. 1895.

A. J. JUKES-BROWNE. See 'W. Hill.'

J. D. KENDALL. CUMBERLAND.

The Whitehaven Sandstone Series [Abstract only; combating the view that these rocks are only stained portions of the Middle Coal-measures]. Quart. Journ. Geol. Soc., May 1895, p. 235, and discussion, pp. 235, 236; abstract in Geol. Mag., April 1895, p. 185.

P. F. K[ENDALL]. CHESHIRE.

Alpine Glaciers [describes an excursion made by some members of the Glacialists' Association to Switzerland during the summer of 1895; compares some gravelly mounds near the village of Premier with similar features near Macclesfield]. Glac. Mag., Dec. 1895, pp. 124-129.

PERCY F. KENDALL. 'VALE OF YORK.'

Notes on the Superficial Geology of the Vale of York [issued in connection with the General Meeting and Excursion, 26th and 27th April 1895]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 89-91.

PERCY F. KENDALL. ALL THE NORTHERN COUNTIES.

Geological Observations upon some Alpine Glaciers [briefly compares the features of the Alps with some in Britain]. Glac. Mag., Jan. 1895, pp. 120-123, and Feb. 1895, pp. 127-132.

P. F. KENDALL [Secretary]. ALL THE NORTHERN COUNTIES.

Erratic Blocks of England, Wales, and Ireland. Twenty-second Report of the Committee . . . [includes records from Cheshire, Derbyshire, Durham, Lincolnshire, Northumberland, and a large number from Yorkshire]. Rep. Brit. Assn., 1895, pp. 426-430.

P. F. KENDALL [Secretary]. NORTHERN COUNTIES.

Erratic Blocks of England, Wales, and Ireland.—Twenty-third Report of the Committee . . . [includes a large number of records from Cheshire, Lincolnshire, Northumberland, Yorkshire, etc., and also contains tables of boulders noted on the Holderness coast between Withernsea and Hornsea by the Hull Geological Society]. Rep. Brit. Assn., 1895, pp. 430-436.

A. H. KENNEY. YORK N.E. AND S.E.

Erosion of Yorkshire Coast [in the British Assn. Report on the Rate of Erosion of the Sea Coasts of England and Wales; details of measurements at different points given]. Rep. Brit. Assn. 1895 (publ. 1896), pp. 381-382.

JAMES W. KIRKBY. See 'T. Rupert Jones.'

PHILIP LAKE. LAKE DISTRICT.

The Denbighshire Series of South Denbighshire [compares (pp. 21-22) the rocks of South Denbighshire with those of the Lake District]. Quart. Journ. Geol. Soc., Vol. 51, Part 1, Feb. 1895, pp. 9-23.

G. W. LAMPLUGH. YORK S.E.

Notes on the White Chalk of Yorkshire [describes the various divisions in the Chalk, and estimates the thickness as follows:—Upper Chalk, without flints, + 650 feet; Middle Chalk, with flints, 460 feet; Lower Chalk, 130 feet; Red Chalk, 30 feet; total, 1,270 feet; this is greater than any previous estimate; appendix 'A' contains detailed particulars of each layer of Chalk between Sewerby and Common Hole, Flambro' Head; and Appendix 'B' details relating to the small faults intersecting the Chalk in the cliff between Danes' Dyke and Old Falls, Flambro' Head]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 65-87, and 89.

G. W. LAMPLUGH. ISLE OF MAN.

The Crush-Conglomerates of the Isle of Man [describes a series of beds of considerable thickness in the Skiddaw Slates of the Isle of Man, which have been locally broken up under shear pressure, and re-arranged in the form of a crush-conglomerate or friction-breccia; with Petrographical Notes by W. W. Watts]. Quart. Journ. Geol. Soc., Vol. 51, Part 4, Nov. 1895, pp. 563-599, with plates and sections; abstract in Geol. Mag., Aug. 1895, pp. 372-373.

ROBERT LAW. YORK S.W.

[Boulders at] Millwood [in the 'Yorkshire Boulder Committee and its Ninth Year's Work]. Nat. Dec. 1895, pp. 341-342.

G. A. LEBOUR. NORTHUMBERLAND.

[Review of] Geological Papers by Henry Garwood, M.A., F.G.S., in Vols. I. and II. of 'A History of Northumberland,' issued under the direction of the Northumberland County History Committee, and edited by Edward Bateson, B.A. [draws attention to those papers, and gives titles, etc.]. Geol. Mag., Nov. 1895, pp. 519-520.

JOSEPH LOMAS. LANC. S.

Notes on Some Fossil Plants from Doulton's Delph, St. Helens [describes a series of specimens collected from an exposure in the Middle Coal Measures, including *Sigillaria* and *Stigmaria*, *Lepidodendron obovatum*, *L. gracile*, *Calamites decoratus*, *C. cannæformis*, *C. approximatus*, *Cordiates*, *Trigonocarpum*, ferns, algæ, etc.]. Proc. Liverp. Geol. Soc., Vol. 7, Part 3, 1894-5, pp. 288-292.

JOSEPH LOMAS. CHESHIRE.

On the Occurrence of Striated Surfaces near Great and Little Storeton [describes striæ exposed by removing the Boulder Clay from the Pebble beds of the Bunter in two different localities; they indicate

that the ice-movement has been from the N.W.]. Glac. Mag., March 1895, pp. 162-164.

JOSEPH LOMAS. LANC. S., CHESHIRE.

On the Glacial Striæ about Liverpool [describes thirty striated surfaces which occur within a radius of 12 miles from Liverpool, viz., at Hale Head, Holt Hill, Tranmere, Birkenhead, Little Storeton, Little Mollington, Seacombe, Bidston, and Flaybrick Hill, which are attributed to 'an immense sheet of ice overriding the country from the N.W.']. Glac. Mag., June 1895, pp. 15-21, with table and plan.

J. LOMAS. CUMBERLAND, WESTMORLAND.

Report of Excursion [of the Liverpool Geological Society] to Appleby, Easter 1895 [a description of the sections visited in conjunction with the geologists from the Yorkshire College, Leeds]. Proc. Liverp. Geol. Soc., Vol. 7, pt. 3, 1894-5, pp. 349-350.

ANTHONY GEORGE LYSTER. LANC. S., CHESHIRE.

Dredging Operations on the Mersey Bar [describes appliances used for making a deep channel through the bar, and refers to the variety in the material dredged up]. Rep. Brit. Assn., 1895, p. 799.

C. A. MCMAHON AND W. MAYNARD HUTCHINGS. YORK N.W. OR N.E.

Note on Pseudo-Spherulites [briefly refers to observations made on the Whin Sill in a previous issue of the Geol. Mag.]. Geol. Mag., June 1895, pp. 257-259.

J. E. MARR. LAKE DISTRICT.

The Tarns of Lakeland [showing that numerous tarns from which the water issues over solid rock are not true rock-basins, the old exit now filled by drift lying at a lower level than the present one; various examples are given of the diversion of the drainage system by moraine matter]. Quart. Journ. Geol. Soc., Feb. 1895, pp. 35-48, with 11 figs. in text; abstract in Geol. Mag., Jan. 1895, p. 44.

J. E. MARR. LAKE DISTRICT.

Physiographical Studies in Lakeland [deals with 'the rivers Caldew and Glenderamachin;' (a) 'Shifting of the drainage of the Troutbeck,' (b) 'The Upper Waters of the Glenderamachin and Caldew,' and (c) 'Minor Moraines in the Glenderamachin Drainage Area']. Geol. Mag., July 1895, pp. 299-303.

J. E. MARR.

Progress in the Study of the Ancient Sediments. Sci. Progr., Vol. 4, 1895, pp. 313 et seq. **[not seen].**

J. E. MARR. LAKE DISTRICT.

Forms of Mountains [pointing out the characteristic forms due to water and frost action respectively]. Nat. Science, April 1895, pp. 240-243.

J. E. MARR. See 'E. J. Garwood.'

J. E. MARR. See 'H. A. Nicholson.'

HERBERT MAXWELL. CHESHIRE.

Growing Stones [note of Folk-lore in Cheshire]. Notes and Queries, 30th Nov. 1895, p. 431.

ALEXANDER MEEK. NORTHUMBERLAND, YORKSHIRE.

The Newcastle Museum of Natural History [refers to the geological contents, etc.]. Nat. Science, Aug. 1895, pp. 115-118.

A. D. MEERES. LANC. S. AND W., FURNESS.

Erosion of Coast of Lancashire since 6-inch Survey, July 23rd, 1892 [in Brit. Assn. Report on the Rate of Erosion of the Sea Coasts of England and Wales; gives details of erosion at different localities, and also points out the extensive gain of land in the Ribble estuary, and near Barrow]. Rep. Brit. Assn., 1895, pp. 386-387.

[?] MELVILLE. NORTHUMB., DURHAM, CUMBD., WESTMORLAND.

Northumberland, Durham, Cumberland, and Westmorland [Erosion of the coasts of; in the Brit. Assn. Report on the Rate of Erosion of the Sea-coasts of England and Wales; particulars given]. Rep. Brit. Assn., 1895, p. 377.

A. T. METCALFE. NOTTS. AND DERBYSHIRE.

The Gypsum Deposits of Nottinghamshire and Derbyshire. Ann. Rep. and Trans. Nottingham Nat. Soc., 1894; see Nat., 1895, p. 308 **[not seen].**

W. W. MIDGLEY. DERBYSHIRE.

Sections from Mountain Limestone [giving a reproduction of slide from the Peak of Derbyshire, showing *Lithostrotion portlocki*, which occurs at Castleton]. Sci. Goss., July 1895, p. 128, and figs. 1 and 2.

W. W. MIDGLEY. LANC. W., YORK MID W.

Foraminiferæ in Mountain Limestone [figuring sections from Skipton, and from an erratic found in the river Wyre, Lancashire]. Sci. Goss., Aug. 1895, p. 165, and two figures.

HUGH ROBERT MILL. LAKE DISTRICT.

The English Lakes: Results of a Bathymetrical Survey [a detailed study of the beds of the lakes by means of numerous soundings]. Geog. Journ., Vol. 6, pp. 46-73, 135-166, with eight folding maps.

HUGH ROBERT MILL. LAKE DISTRICT.

Bathymetrical Survey of the English Lakes. Geog. Journ., Vol. 6, pp. 46-73, 135-166; abstract in Glac. Mag., Sept. 1895, pp. 105-106.

T. CARTER MITCHELL. YORK MID W.

[Boulders at] Baldersby [in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, pp. 342-343.

J. R. MORTIMER. YORK S.E.

The Opening of Six Mounds at Scorborough, near Beverley [describes the contents of some British tumuli]. Trans. East Riding Antiq. Soc., Vol. 3, 1895, pp. 21-23.

J. R. MORTIMER. YORK S.E.

The Grouping of Barrows and its bearing on the religious belief of the Ancient Britons [from observations on the barrows on the Yorkshire Wolds]. Trans. East Riding Antiq. Soc., Vol. 3, 1895, pp. 53-62 (plate).

G. H. MORTON. LANC. S., CHESHIRE.

The Recent and Fossil Flora and Fauna of the Country around Liverpool. Proc. Liverp. Nat. F. Club, 1894, pp. 10 et seq. **[not seen].**

H. A. NICHOLSON AND J. E. MARR. LAKE DISTRICT.

Notes on the Phylogeny of the Graptolites [specimens from the Skiddaw Slates of Troutbeck and Outerside, near Keswick, described]. Geol. Mag., Dec. 1895, pp. 529-539.

E. ADRIAN WOODRUFFE PEACOCK. LINC. N.

The Yorkshire and Lincolnshire Naturalists' Unions at Broughton Wood and Twigmoor Gullery [Geology]. Nat., Aug. 1895, pp. 230-231.

E. ADRIAN WOODRUFFE PEACOCK. LINC. N. AND S.

The Natural History Divisions of Lincolnshire [Geology referred to]. Nat., Oct. 1895, pp. 289-301; with coloured map of the soils, etc., by A. J. Jukes-Brown[e].

G. L. PEPLER. See K. A. Hinde.

FREDK. O. PICKARD-CAMBRIDGE. See under 'Cambridge.'

S. SYDNEY PLATT. LANC. S.

Notes on a large Fossil Tree recently found in Shale of the Coal Measures, at Sparth Bottoms, Rochdale [describes and figures an erect stem of *Sigillaria*, seven feet in height, with roots in position; discussion by various gentlemen also printed]. Trans. Manch. Geol. Soc., Vol. 23, Part 3, 1895, pp. 65-72.

S. SYDNEY PLATT. LANC. S.

Large Fossil Trees found at Sparth Bottoms, Rochdale [in the Coal Measures]. Trans. Rochdale Lit. and Sci. Soc., Vol. 4, 1895, pp. 90-92, with photograph as frontispiece.

J. POSTLETHWAITE. LAKE DISTRICT.

Notes on Some Railway Cuttings near Keswick [Abstract only; describes sections in the Drift, Skiddaw Slates, and a decomposed diabase dyke]. Quart. Journ. Geol. Soc., Vol. 51, Part 3, Aug. 1895, p. 493; abstract also in Geol. Mag., June 1895, p. 282.

JOSEPH PRESTWICH. YORK N.E. AND S.E.

On Certain Phenomena | belonging to the close of | the last Geological Period | and on their bearing upon | The Tradition of the Flood | by | Joseph Prestwich, D.C.L. (Oxon.), F.R.S., F.G.S. . . | . . | London | . . | . . | 1895. . . | pp. vii. -87 [contains brief references to the drifts of the Eastern Counties, their contained Scandinavian erratics, etc.].

C. E. DERANCE. **See under 'DeRance.'**

JOHN RANDALL.

The Midland Coalfields and superimposed Rocks. Coll. Guard., Vol. 70, 1895, pp. 652 et seq., 782 et seq.

T. MELLARD READE. ALL THE NORTHERN COUNTIES.

British Geology in relation to Earth-Folding and Faulting [Presidential Address to the Liverpool Geological Society, 1895, contains numerous references to the northern counties]. Geol. Mag., Dec. 1895, pp. 557-565.

T. MELLARD READE. LANC. S.

Note of further Glacial Striæ at the Quarry, Little Crosby [records striæ 30° west of north, on a surface of Keuper Sandstone; a small boulder of Eskdale Granite was found in the 'covering sand' above the striæ]. Proc. Liverp. Geol. Soc., Vol. 7, pt. 3, 1894-5, p. 326.

T. MELLARD READE. See 'T. W. Davies.'

W. R. COWPER REED. LAKE DISTRICT.

The Geology of the Country around Fishguard, Pembrokeshire [briefly compares with Mr. Alfred Harker's observations on the rocks of Cross Fell, Carrock Fell, etc.]. Quart. Journ. Geol. Soc., Vol. 51, pt. 2, May 1895, pp. 149-195.

R. RUSSELL. CUMBERLAND.

The Extension of the West Cumberland Coalfield Southward and Northward under the St. Bees Sandstone. Trans. N. Engl. Inst. Min. and Mech. Eng., Vol. 44, 1895, pp. 234 et seq.; and Trans. Fed. Inst. Min. Eng., Vol. 8, 1895, pp. 276 et seq.

W. RUSSELL. YORK N.E. AND S.E.

[Erosion of Yorkshire Coast; in Brit. Assn. Report on the Rate of Erosion of the Sea Coasts of England and Wales; gives details of the rate of erosion of the cliffs at different points, and suggests causes]. Rep. Brit. Assn., 1895, pp. 383-386.

THOMAS SALTONSTALL. YORK S.W.

[Boulders at] Luddenden Foot, Sowerby, etc. [in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, p. 342.

C. E. SALVESEN. YORK N.E. AND S.E.

[Erosion of Yorkshire Coast; in Brit. Assn. Report on the Rate of Erosion of the Sea Coasts of England and Wales; during 40 years' estimates the annual rate of erosion at about 3 feet $3\frac{1}{2}$ inches]. Rep. Brit. Assn., 1895, p. 383.

D. H. SCOTT. LANC. S., YORK S.W.

Williamson's Researches on the Carboniferous Flora. Sci. Progr., Vol. 4, 1895, p. 253 **[not seen].**

D. H. SCOTT. See 'W. C. Williamson.'

H. G. SEELEY. YORKSHIRE ?

On a Pyritous Concretion. Ann. Rep. Yorks. Phil. Soc. (York), 1895.

A. C. S[EWARD]. YORK S.W., LANC. S.

William Crawford Williamson. Born November 24, 1816. Died June 23, 1895 [Obituary notice; contains particulars of his work amongst the Yorkshire and Lancashire Coal-Measure plants, etc.]. Nat. Science, Aug. 1895, pp. 141-143.

THOMAS SHEPPARD. YORK S.E.

On another Section in the So-called Inter-glacial Gravels of Holderness [decribes a pit at Burstwick, and gives lists of boulders, shells, and mammalian remains; concludes that there is no evidence of a warm inter-glacial period, and suggests that the gravels form part of a moraine laid down by the North Sea Ice-Sheet]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 1-14, with section.

THOMAS SHEPPARD. YORK N.E. AND S.E. AND LINC. N. AND S.

On the Occurrence of Scandinavian Boulders in England [criticises Sir H. H. Howorth's hypothesis that the Scandinavian boulders found in England had been brought over as anchors by the Vikings; gives full list of records of Scandinavian erratics found in England, some being from great depths in the ground several miles from the sea]. Glac. Mag., Dec. 1895, pp. 129-132 (and two tables).

T. SHEPPARD. YORK S.E.

[Boulders at] Burstwick [in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, p. 343.

J. SHIPMAN. NOTTS.

The Coal Measures of the Leen Valley. Ann. Rep. and Trans. Nottingham Nat. Soc., 1894 (see Nat., 1895, p. 308).

J. SHIPMAN.

The Leen Valley Coal Measures. Colliery Guardian, Vol. 69, 1895, pp. 82 et seq.

J. SMITH. LANC. S.

Pigmy Flints [note suggesting that the minute flakings on the flints described by the Rev. R. A. Gatty in a previous issue are the results of the usage of the flints; see 'Reginald A. Gatty']. Sci. Goss., May 1895, p. 82.

W. J. SOLLAS. ISLE OF MAN.

An Experiment to Illustrate the Mode of Flow of a Viscous Fluid [confirms by experiment the suggestion made by P. F. Kendall that the ice sheet which covered the Isle of Man lifted boulders from Granite Mountain (679 feet) on to the flanks of South Barrule up to 100 feet below its summit, which is 1,588 feet above sea level]. Quart. Journ. Geol. Soc., Vol. 51, Part 3, Aug. 1895, pp. 361-368 (sections).

J. SPINK. YORK N.E.

Lake-Dwellings in the Vale of Pickering [describes a series of objects unearthed from the bed of the Costa; several upright piles were also found]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 21-24.

J. W. STATHER. YORK N.E. AND S.E.

[Boulders at] Melton and Bessingby [in 'The Yorkshire Boulder Committee and its Ninth Year's Work']. Nat., Dec. 1895, pp. 343-344.

C. FOX-STRANGWAYS. 'VALE OF YORK.'

Glacial Phenomena near York [describes the various glacial beds in the Vale of York, with especial reference to the morainic mounds upon which York stands; gives criticisms on certain points contained in a paper by P. F. Kendall in a previous volume]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 15-20, with large folding map.

C. FOX-STRANGWAYS. LINC. N.

Estuary of the Humber [erosion of the shores of; in the Brit. Assn. Report on the Rate of Erosion of the Sea-coasts of England and Wales; between Ferriby Sluice and Ferriby Hall 150 and 80 yards respectively have disappeared since Ordnance Map sheet 86 was made]. Rep. Brit. Assn., 1895, p. 377.

JOHN STEARS. YORK S.E.

Particulars of Strata at Ganstead, in Holderness [boulder clay and gravel, and finally chalk marl]. Proc. Yorks. Geol. and Polyt. Soc., 1895, p. 88.

F. E. SWAINSON. See W. L. H. Duckworth.

M. SWENY. LANC. S., CHESHIRE.

The Sea Approaches to the Mersey. 1895, 8vo, three plates **[not seen].**

THOMAS TATE. YORK N.W., MID W., S.W., N.E., AND S.E.

The Yorkshire Boulder Committee and its Ninth Year's Work [gives particulars of boulders observed in various parts of the county, and table of over 2,000 boulders observed on the Holderness coast by the East Riding Boulder Committee]. Nat., Dec. 1895, pp. 339-345.

THOMAS TATE. YORK MID W.

The Malham Dry River Bed [refers to previous literature on the subject to some length; the author's views are also briefly given; illustrated by map and nine excellent photos by Godfrey Bingley]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 58-63.

THOMAS TATE. YORK MID W.

[Geological observations made with the] Yorkshire Naturalists at Knaresborough. Nat., May 1895, pp. 148-9.

WARREN UPHAM. ALL THE NORTHERN COUNTIES.

View of the Ice Age as Two Epochs, the Glacial and the Champlain [correlates the glacial series of north-western Europe with those of North America]. Glac. Mag., Dec. 1895, pp. 113-122 (two plates).

W. Y. VEITCH. YORK N.E.

Geological Notes of an Excursion made by the [Cleveland Naturalists'] Field Club to Runswick Bay [describes the beds in the lias, etc., then examined]. Proc. Cleveland Nat. Field Club, 1895, pp. 12-13.

W. W. WATTS. ISLE OF MAN.

Petrographical Notes on the 'Crush-Conglomerates' of the Isle of Man [appendix to Mr. Lamplugh's paper]. Quart. Journ. Geol. Soc., Vol. 51, Part 4, Nov. 1895, pp. 588-599 (plates).

E. B. WETHERED. DERBYSHIRE.

The Formation of Oolite [pointing out the importance of Girvanella and other tubular organisms in the formation of oolitic structure: two grains from the carboniferous limestone of Buxton figured]. Quart. Journ. Geol. Soc., May 1895, pp. 196-205, plate 7.

W. WHITAKER. LINC. S.

Underground in Suffolk and its Borders: Address to the Geological Section [of the British Association; refers (p. 469) to a boring, 1,500 feet in depth, which penetrates into the Carboniferous rocks, at Scarle, south-west of Lincoln]. Geol. Mag., Oct. 1895, pp. 461-471.

W. WHITAKER. ALL THE NORTHERN COUNTIES.

Second Chronological List of Works referring to Underground Water, England and Wales [being Appendix to the Brit. Assn. Report on the Circulation of Underground Waters; contains numerous references of value to north of England geologists]. Rep. Brit. Assn., 1895, pp. 394-402.

W. WHITAKER. ALL THE NORTHERN COUNTIES.

Second Chronological List of Works on the Coast-changes and Shore-deposits of England and Wales [being Appendix IV. to the Report on the Rate of Erosion of the Sea Coasts of England and Wales; contains references to several papers dealing with the coasts of the northern counties]. Rep. Brit. Assn., 1895, pp. 388-392.

W. C. WILLIAMSON. LANC. S., YORK S.W.

On the light thrown upon the Question of the Growth and Development of the Carboniferous Arborescent Lepidodendra by the Study of the Details of their Organisation. Mem. Manch. Lit. and Phil. Soc., 1895, Sec. 4, Vol. 9, pp. 31 et seq. **[not seen].**

W. C. WILLIAMSON AND D. H. SCOTT. LANC. S., YORK S.W.

Further Observations on the Organisation of the Fossil Plants of the Coal Measures.—Part I. *Calamites, Calamostachys,* and *Sphenophyllum*. Phil. Trans. Roy. Soc. London (B), Vol. 185, 1895, pp. 863 et seq. **[not seen].**

W. C. WILLIAMSON AND D. H. SCOTT. LANC. S., YORK S.W.

Further Observations on the Organisation of the Fossil Plants of the Coal Measures.—Part II. The Roots of *Calamites*. Proc. Roy. Soc. London, Vol. 57, 1895, pp. 1 et seq. **[not seen].**

W. C. WILLIAMSON AND D. H. SCOTT. LANC. S., YORK S.W.

Further Observations on the Organisation of the Fossil Plants of the Coal Measures.—Part III. *Lyginodendron* and *Heteragium*. Proc. Roy. Soc. London, Vol. 58, 1895, pp. 195 et seq. **[not seen].**

W. C. WILLIAMSON AND D. H. SCOTT. YORK S.W., LANC. S.

On Lyginodendron and Heterangium [giving lengthy abstract of paper in Phil. Trans.; *Lyg. oldhamianum*, one of the commonest Lancashire and Yorkshire coal-measure fossils, and *Heterangium grievii* in the coal-measures of Dulesgate, Lancs., and *H. tiliæoides* from Halifax coal-measures]. Ann. of Bot., Sept. 1895, pp. 525-535.

R. WINSTANLEY. ISLE OF MAN, LAKE DISTRICT, ETC.

A Few Thoughts on Geology [being the Presidential Address to the Manchester Geological Society; various geological features in the north of England briefly referred to]. Trans. Manch. Geol. Soc., Vol. 24, Part 2, 1895, pp. 38-52.

ARTHUR SMITH WOODWARD [not signed]. YORK N.E. AND S.E.

Malton Naturalists' Society. Presidential Address [by Arthur Smith Woodward; contains brief notes on the geology of the district]. N. and E. Yorks. Science Notes, Nov. 1895, pp. 54-56.

ARTHUR SMITH WOODWARD. YORK N.E.

On the Fossil Fishes of the Upper Lias of Whitby. Part I. [Describes and figures *Leptolepis saltviciensis, Eugnathus fasciculatus, Pholidophorus germanicus*, and *Ptycholepis bollensis*, from the Whitby Lias, all of which are in the British Museum]. Proc. Yorks. Geol. and Polyt. Soc., 1895, pp. 25-42, and 3 plates.

HENRY WOODWARD. **See 'T. Rupert Jones.'**

LINCOLNSHIRE COAST BOULDERS.

F. M. BURTON, F.L.S., F.G.S.,
Highfield, Gainsborough, Lincolnshire.

In dealing with this subject Mr. Harker, in his recent article in 'The Naturalist,' on 'The Southward Movement of Beach-material across the Humber Gap,' gives an explanation in favour of his view which requires attention and consideration. He abandons 'the powerful tidal scour,' and, 'while not denying the possibility that some of the boulders on the Lincolnshire coast may have a different source,' he still adheres 'to the view that many, and probably the large majority, of them are derived from the waste of the Holderness cliffs.'

As I understand it, he allows that the material from the Yorkshire coast cannot pass the Humber current at the present day (and of this the existence of the narrow bank of shingle at Spurn Point is a sufficient proof), but he raises the hypothesis that this shingle bank, now some three miles long and only some 300 years old (for it did not exist, he says, when Camden described the locality in 1586), is merely a repetition of other banks of a similar nature, which have been formed from time to time in the same situation, and which have been successively breached by the river, near the point of their junction with the land (the neck as he terms it), allowing the current to resume its former course, and thus transferring the material collected in the north to the south of the river Humber.

Now what proof there is of this ever having occurred he does not say; but, supposing it to be an authenticated fact, would the material so situated ever be able to reach the Lincolnshire shore? Certainly not, I think, unless the coast in question in former days differed altogether from its present character.

It is difficult, of course, to speak with any precision as to what has taken place on land surfaces during long-past periods, as such surfaces are necessarily continually changing; but, to all appearance, the contour, depth, and nature of the Lincolnshire coast has (speaking generally and allowing for denudation) continued the same as it is at the present time for ages past; ever since the Trent flowed in its old course into or over what is now the Wash; before the time when the dominant Humber captured it: a time which takes us back to the far off Glacial period.

As regards Mr. Harker's reference to Camden I have not the

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work before me, but might not the author have treated the bank as part and parcel of the land without taking notice of the difference in composition? If not, and if there was no shingle bank in existence when he described the locality, then that must have been one of the periods referred to when the spit had been breached at the neck and the material swept away by the river current. And, surely, had this been the case, there would have been some existing record at the time of the event; for unlike the building up of the bank, which would be of comparatively slow growth, the sudden breaching of the structure would, I should imagine, be more or less of a catastrophic nature.

Then supposing again the theory to be true, would not the river, in resuming its old course, be more likely to carry the shingle by its broad current out to sea instead of banking it up on the south?

Mr. Clement Reid, as Mr. Harker reminds us, 'points to the existence of a very large shingle beach near Donna Nook, on the south side of the Humber mouth,' which he, Mr. Harker, says 'can only have been derived from the other side of the estuary;' and he adds, 'there are many vanished Spurn points to account for, and it cannot be doubted that the material from them is scattered along the coast from the Humber to the Wash at least.' To my mind, however, there is a great deal of doubt as to this.

Why should not this large shingle beach have been derived from the Lincolnshire coast? Why rely on a 'Deus ex machinâ' for the existence of Lincolnshire boulders on the Lincolnshire coast when the material itself is found there? No one can deny the existence of boulder deposits all over the land bordering this coast to the east of the wolds, where they lie under the post-glacial deposits and are exposed in many places; and no one can doubt that cliffs like those at Holderness once skirted the shore, of which the cut-down cliff at Cleethorpes is the only remnant. And is it not more likely that this bank at Donna Nook is the result of the wearing away of these cliffs by the current on the Lincolnshire side than of its being derived from the Yorkshire cliffs on the other side of the river? Its position, too, would confirm this, for it lies just where one would expect to find it, if brought down by the river on the Lincolnshire side; as the land at Donna Nook forms a sort of promontory, beyond which the coast line takes a more southerly course.

Mr. Harker further asks what has become of the millions of tons of material swept southwards along the Holderness coast

prior to 1586—the date of Camden's work—and he says, 'There is only one possible answer: it is distributed along the coast south of the Humber.' This is entirely begging the question, for it assumes that the material, from whatever source it comes, once on the south side of the river, would be able to reach the coast and be carried down it by currents; a fact which, after reading Mr. Wheeler's lucid account of wave and tidal action generally, and of that of the district in question in particular, seems to me impossible.

On the other hand, I would ask what has become of all the material which has been denuded from the boulder cliffs of the Lincolnshire coast? And, again, which is the most likely to be the case, that the material now found there should have been derived from the northern side of the Humber current, which would prevent its crossing to the south; or, from the southern Lincolnshire side, where it would have no current to oppose it, and where the material lies ready to hand?

In connection with the question of currents, Mr. Harker in his paper quotes two clauses from the extracts I made from Mr. Wheeler's pamphlet, as bearing on his view of the subject: one that 'there is a drift of material along the beach from north to south,' and the other that 'the banking up of the shingle and also the travel along the shore is due entirely to tidal action;' but the 'drift' Mr. Wheeler alludes to in the first quotation is that which collects at Spurn Point, as he distinctly states, and as the context shows; and with regard to the second, a reference to the context again shows that Mr. Wheeler is speaking of 'shingle' proper, quoting the bank off Spurn Point as an example; and on the Lincolnshire coast we have no element of that kind; all is sand and mud; and the boulders, which lie hidden under it, are only occasionally revealed when storms have swept the covering of sand and mud from off them. With reference to this latter coast Mr. Wheeler says:—'On this beach there is no appreciable littoral drift or alteration in form. Sand does not accumulate against the piers or groynes which extend across the shore; and the general outline of the beach remains as it always has been so far as any record exists.' That this is so, surely the large bank of shingle at Donna Nook is a proof, for if any strong drift existed would not this bank be carried down the shore instead of remaining heaped up as Mr. Clement Reid describes it?

The whole of the evidence, as well as the facts, seem to me to point conclusively to the erratics on the Lincolnshire coast

being derived from the cliffs and boulder deposits south of the Humber; and if any came from the Yorkshire coast it must have been before the Humber gap was formed: a time so distant that to speak about it with authority would be impossible, and speculation idle.

Since writing the above I have received a letter from Mr. Wheeler, and send the following extracts from it:—

'I cannot follow Mr. Harker as to what happened in remote times. My geology is only that relating to what is going on now, and is of use to engineers in sea coast protection and other works. I do not accept his theory as to Spurn Point. To quote Camden as an authority on such a matter counts for nothing. He was a very good general observer, but, like the old chart and map makers, "de minimis non curant," to use an adapted legal term. Spurn Point was worse to get at then than it is now, and I cannot conceive that he would have devoted his time and energies to a few yards of shingle beach.

'Of one thing I am as certain as one can be about anything of the sort, that there is no travel of stone from the north to the south side of the Humber now. The millions of tons of material that must have washed, according to Mr. Harker, from the Yorkshire cliffs show no trace of their existence along the Lincolnshire coast. It is one mass of sand resting on soft clay, under which is a layer of peat and trees, and then the boulder clay with stones.

'As regards the "millions of tons," this is surely an exaggeration. The Yorkshire cliffs consist of boulder clay; the stones do not form, probably, one-tenth of the mass. Many of them, in being rolled about, get ground to sand; and the bulk of the material goes away in suspension, and is deposited on the bed of the sea.

'I made a purpose journey to Sutton and Mablethorpe a few days ago to have another look at the beach. The stones are few and far between. Here and there a small packet is gathered, and this principally at low water, or say the line of three-quarter ebb. They are not buried in the sand, as, for a large area between low water and high water, the beach has been denuded and the soft clay exposed.

'If the stones had travelled in number from the Yorkshire cliffs, they would have been aggregated in a mound at or about the level of high water, like all other shingle banks; instead of which, such few as there are are not in this position, and are only collected in small heaps near the groynes, or in holes in the clay.

'If they had travelled the thirty or forty miles from Yorkshire they would be rounded and waterworn, and be like shingle. The bulk of the stones have their edges rounded, but not sufficiently to indicate any long journey (the stones along the Yorkshire coast itself are more worn), and there are many, especially the flints and some of the granite, which have their edges as sharp as the day they were born, and every appearance of only having been released from the drift in which they had been bedded very recently.

'They are of the same character as those I have found in the boulder clay in other parts of this coast, except that I did not come across any Oolite stones, but I found several fragments of Septaria, similar to those found in the excavations here.'

'June 1899.' '(Signed) W. H. WHEELER.'

NOTES—ORNITHOLOGY.

Wryneck at Beverley.—The Wryneck (*Iynx torquilla*) has occurred in the East Riding this summer, as I had the good luck to see one perched on a thorn bush near Beverley on the evening of 20th August, and obtained an excellent view of it.—J. R. LOWTHER, Crane Hill, Beverley, 9th September 1899.

Herons in Northumberland.—I was in some very large and dense woods in Northumberland a fortnight ago and suddenly came across fully a dozen Herons (*Ardea cinerea*). I think they were prospecting for a heronry, as no one in the district seemed to have any idea they were there. —H. T. ARCHER, 3, Burnside Terrace, Newcastle-on-Tyne, 26th April 1899.

Late Singing of Nightingale.—On the 8th July I heard a Nightingale (*Daulias luscinia*) in full song in a wood near here, where there are always several pairs. These birds usually give up singing about the middle of June, and the latest record I had before this was on the 18th of that month, in a wood near Grantham. No doubt the bird in question had either been robbed of its nest or had lost its mate and was nesting again. —F. M. BURTON, Highfield, Gainsborough, 28th July, 1899.

Early Arrival of Migrants near Horncastle.—On the 10th October I observed in this parish a Snipe (*Gallinago gallinago*) and a Woodcock (*Scolopax rusticola*). This is remarkable in view of the fact that the first flight of Woodcocks is generally observed from the 15th to the 20th of October, whilst the visit of the Snipe is considerably later. The Missel-Thrush (*Turdus viscivorus*), the harbinger of winter, has also arrived. —J. CONWAY WALTER, Langton Rectory, Horncastle, 13th October 1899.

Relics of the Storm. -On Friday afternoon, 22nd September, as Mr. H. Preston, F.G.S., was cycling home from the Waterworks, he noticed a strange bird fluttering on the North Road, near Saltersford Lane, Grantham. Upon capturing the bird it proved to be a Stormy Petrel (*Thalassidroma pelagica*), or Mother Carey's Chicken a bird met with far out at sea, and frequently seen riding on the waves in the more stormy weather. No doubt the pretty little creature had drifted inland with the recent boisterous weather, and had at last fallen exhausted. Mr. Ringer, taxidermist, of Watergate, is preserving the bird for the Grantham Museum.

Mr. Norman Brown shot another hovering over a small patch of turnip in Leicestershire between the 22nd and 30th September.—E. A. WOODRUFFE-PEACOCK, Cadney, Brigg, 4th October 1899.

NOTES—FLOWERING PLANTS.

Walney Island in V.C. 60!—See ante, p. 299. May I ask on what authority Mr. F. Arnold Lees places Walney in the same Watsonian vice-county as the 'limestone south of Silverdale?' In the map accompanying 'Topographical Botany,' ed. 2, Walney is coloured the same tint as V.C. 69. Westmorland and North Lancashire, and so far as I can see there is nothing in the text of the book to justify such a claim for V.C. 60. Further, Mr. Lees placed his own finds on Walney in the Record Club's issue in the V.C. 69. Possibly there is some other means of explaining the apparent divergence, but except some printer's jumble it is not easy to see what way remains.—S. L. PETTY, Ulverston, 4th October 1899.

***Galeopsis versicolor* in mass near Gainsborough.**—So far as my experience goes, this very local plant is usually met with singly, or only a few together at a time, in cornfields and by the side of woods and coppices, where it does not attain a height of more than a foot or so. On the 21st of this month, however, as I was walking on the bank of the Trent between Gainsborough and Walkerith, I found it growing in considerable quantity, in tall clumps 2 feet to 3 feet high, pushing large trusses of its splendid yellow and purple flowers, here and there, out from the top of a cut-down hedge which skirted the bank; and forming one of the most beautiful plant-objects I ever remember meeting with in this country. I shall be glad to know whether this is of common occurrence in other localities or not.—F. M. BURTON, Highfield, Gainsborough, 28th July, 1899.

Blea Tarn.—If your readers have not had sufficient of this subject, may I reiterate the necessity of a wandering botanist carrying a small ordnance map and marking his route on it, and the date at end of each day. His note-book and map will then show him, at any future time, the exact line traversed and what he saw on the way. It is what I should do if over the borders of the neighbouring counties. In Lancashire I do not date the map; that is not necessary, as the 6-inch to mile is used, and on these every house, or to be more correct, building, is marked and named, as are the culverts, etc.; besides I know somewhat of the area.

The terms 'Tarn' and 'Water' are interchangeable, e.g., Esthwaite Water or Tarn. No reliance can be placed on such, but I believe only to the large ones is the term water applied, as the instance above and, too, Levers Water. Of Elterwater, Mr. H. S. Cowper in his recently-issued 'Hawkshead, its History and Archæology,' p. 9, says, 'The tarn or "water" is somewhat featureless.'—S. L. PETTY, Ulverston, 4th Oct. 1899.

[This note will serve to conclude the discussion, but the whole series of notes shows that a little initial care and accuracy in making observations saves much subsequent trouble.—ED. Nat.]

Botanical Waifs in Lakeland.—During a recent visit to Keswick (August 1899) I found a number of waifs by the railway station at Braithwaite which perhaps deserve to be recorded. Mr. S. T. Dunn, B.A., F.L.S., of Kew Gardens, is at present engaged on working out the aliens which occur in different parts of the country, and the list is taken from his report, the plants being sent direct to him. They had evidently grown up where the seed had fallen from the grain wagons and trucks shunted on to the goods siding. They included:—

Fœniculum officinale All.
Saponaria vaccaria L.
Phalaris minor L.
Melilotus parviflora Lam.
Melilotus arvensis Wallr.
Polygonum Convolvulus var. *pseudodumetorum*.
Atriplex patula forma.
Trifolium resupinatum L.
Linum usitatissimum L.
Polygonum lapathifolium L.

—HILDERIC FRIEND, Chichester, 4th October 1899.

LINCOLNSHIRE HARVESTMEN OR PHALANGIDEA.

REV. EDWARD ADRIAN WOODRUFFE-PEACOCK, L.Th., F.L.S., F.G.S.,
Vicar of Cadney; Organising and Botanical Secretary, Lincolnshire Naturalists' Union.

THE present list of Phalangidea, or Harvestmen, has been been made up from species taken this season (1898), by the men on whose authority they are now published, while hunting for Araneidea, or Spiders, to complete our Lincolnshire list. They have all been submitted to the Rev. O. Pickard-Cambridge, Bloxworth Rectory, Wareham, for identification; to whom our very best thanks are due. The order followed is that of his monograph *On the British Species of Phalangidea or Harvestmen* in the *Proceedings of the Dorset Natural History and Antiquarian Field Club*, Vol. 11, pp. 163-216, with five plates, published in 1890. Of the 24 recorded British species 11 have been taken this season in Lincolnshire.

Our workers have been the Rev. H. C. Brewster, South Kelsey Rectory, Lincoln; W. Hunter Gandy, Wellingore Hall, Lincoln; W. Lewington, King Street, Market Rasen; A. Smith, 24, Peaksfield Avenue, Grimsby; W. Worsdale, Grantham; and myself. No records appear to have been published before.

The numbers prefixed to the records denote the districts in which the localities are situate; and 'N.' and 'S.' stand for North and South Lincolnshire respectively.

Liobunum rotundum Latr. N. 10, Tumby Wood, Peacock.

Liobunum blackwallii Meade. S. 13, Hartsholme, Lewington.

Phalangium opilio Linn. N. 3, Cadney, Peacock. N. 5, Kirton and Gainsborough, Peacock. N. 7, South Kelsey, Brewster. N. 10, Tumby Wood, Peacock. S. 15, Grantham, Worsdale.

Phalangium parietinum DeGeer. N. 7, Market Rasen, Lewington.

Phalangium saxatile C. L. Koch. N. 5, Cleatham, Gandy and Peacock. N. 7, Market Rasen, Lewington. S. 15, Grantham, Worsdale.

Platybunus corniger Herm. N. 3, Cadney, Peacock.

Platybunus triangularis Herbst. N. 3, Cadney, Peacock.

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Oligolophus morio Fabr. N. 4, Ravendale, Smith. N. 7, Market Rasen, Lewington. N. 10, Tumby Wood, Peacock. S. 13, Hartsholme, Lewington and Peacock.

Oligolophus agrestis Meade. N. 7, Market Rasen, Lewington; South Kelsey, Brewster. N. 10, Tumby Wood, Peacock. S. 13, Hartsholme, Peacock.

Oligolophus spinosus Bosc. S. 15, Grantham, June and September, Worsdale.

Nemastoma lugubre O. F. Muller. N. 3, Cadney, Peacock. S. 15, Grantham, Worsdale.

2nd Dec. 1898.

NOTE—HYDROZOA.

Early Records for Cumberland Hydrozoa, etc. — The earliest record that I have found so far for this class is in Ellis' 'An Essay towards a Natural History of the Corallines,' 1755, p. 23:—'*Corallina ramosa, ramis singulis equisitiformibus, in summis capillamentis contortis et verticellatim dispositis vesiculas campaniformes gerens.* This curious Coralline was collected on the sea coast near Whitehaven, in Cumberland, by that learned and eminent physician, Dr. William Brownrigg, F.R.S.' This species is *Campanularia verticillata* L. Can any reader assist me to an earlier record of this or any other species of Polyzoa or Hydrozoa in Cumberland? —S. L. PETTY, Ulverston, 17th October 1899.

NOTE—COLEOPTERA.

***Galerita bicolor* at Doncaster.**—Some time ago, in looking through the collection of Mr. Paterson, I noticed a Carabid which appeared to me to be something new. Its owner kindly permitted me to take it away for a more detailed examination. Failing to fix it myself, I submitted it to Mr. J. J. Walker, of Sheerness, who has just returned it named *Galerita bicolor* Drury, and adds 'it is a native of North America, of course it has no claim whatever to be regarded as a British beetle, but its occurrence in Doncaster, is, to say the least, curious, and I thought it of sufficient interest to exhibit on your behalf at the Entomological Society's meeting last Wednesday.'—E. G. BAYFORD, 2, Rockingham Street, Barnsley, 15th Oct. 1899.

NOTES—LEPIDOPTERA.

Death's-Head Moth at Wakefield.—Two fine larvæ of *Acherontia atropos* were picked up when crossing a path in our public park, one on 30th August, the other 2nd September; rather singular both were gathered at one place. G. W. PARKIN, 15, York Street, Wakefield, 3rd Sept. 1899.

Hummingbird Hawkmoth in Lake Lancashire.—Not being an active entomologist, it is only occasionally that an insect attracts my attention, unless there happens to be something strange about it. In my garden, on the second Sunday in August (13th) a Hummingbird Hawkmoth was busy on the flowers of *Weigelia coccinea*. It stayed about ten minutes and did not return so far as my children could see, and they wanted it.—S. L. PETTY, Ulverston, 4th October 1899.

THE THREE GRACES.

F. ARNOLD LEES, M.R.C.S.,
Leeds.

Flora of Cumberland. By **Wm. Hodgson,** 1899.

Flora of Cheshire. By the late **Lord De Tabley** (Hon. J. B. Leicester Warren). Edited by SPENCER MOORE. With a Biographical Notice of the Author by Sir M. E. GRANT DUFF. 8vo., cl., pp. cxiv., 399. Port., Map. 1899. Longmans. Price 10s. 6d. net.

Flora of Kent: being an account of the Flowering Plants, Ferns, etc., with notes on the Topography, Geology, and Meteorology, and a History of the Botanical Investigation of the County. By **F. J. Hanbury,** F.L.S., and **E. S. Marshall,** M.A., F.L.S. 8vo., pp. lxxxiv., 444. Two Maps. 1899. Hanbury, 37, Lombard Street. 12s. 6d.

Here are three Graces, indeed! arrayed in all pride by their begetters, charming as 'the three maids of Lee,' yet differing from one another in their respective complexions as blonde from brunette, yet of course somewhat alike, as fair sisters should be, in their general features. Yet they differ in consistency and character as Kentish chalk from Cheshire cheese. The Cumbrian one is the poorest, maybe in part because least worked; Lord Tabley's florograph is like his own rich buttercupped fields and well-preserved woods, utilitarian from cover to cover, but a picturesque product for all that, with the smack of a natural sub-acid 'green fade' through its every part; whilst Messrs. Hanbury and Marshall's flower-picture is opulent with parti-coloured detail, stippled in with a painstaken technic—the completest phyto-historically and most up to date of the three.

With the Cumbrian work it is not necessary to go into detail here. Certain vital omissions have been made which will doubtless form the subject of a special enumeration elsewhere. I would just say, here, only, that it is rather a skeleton than a full-built body, not up-to-day in its nomenclature, and badly proof-read. The neglected species already on record for the county (teste H. C. Watson's 'Topographical Botany') are ten in number, viz.; *Myosurus minimus, Arabis petræa, Astragalus glycyphyllos, Lathyrus palustris, Potentilla alpestris, Statice rariflora, Rumex aquaticus, Goodyera repens* (Hutton's old authority confirmed by an Armathwaite specimen!), *Epipactis violacea* (Prof. Babington's authority), and *Potamogeton Zizii.* Some of these may have become extinct through that Ichabodic change in the sum total of locality-environment which is subtly affecting the items in the flora of areas all over this country; but all

have occurred; whilst at least two species-names have been admitted into the book for which no station of growth is or can be given.

The county of Kent comes not within our purview, but it may be worth the pointing out that Kent shares with Lincolnshire the distinction of furnishing a naturalising field for *Falcaria vulgaris* Bernh. (*Rivini*), No. 688 in the 9th edition of London Catalogue. This handsome-leaved plant, tenacious of life through tough quitch-like roots, has established itself near the Barracks at Lincoln, just as it persists in arable ground at Wingham, five miles east of Canterbury. Once introduced, with grain-seed probably, no ploughshare furrows deeply enough to eradicate it. Kent, too, has a few north-country indigens, witness *Draba muralis, Pyrola minor, Eriophorum vaginatum*, and others.

Lord De Tabley's posthumous Flora of Cheshire demands a fuller examination at our hands. The author was both scientist and poet, plus a classic scholar and an antiquarian. From such a conjunction of capacities we should expect something out-of-the-way, perhaps even great—and we get it! The Grant-Duff sympathetic memoir shows us what to look for; Spencer Moore's judicious editing, how to find it; and, again, with such excellent guides we see it at once—a grand picture, broadly pre-explained and framed. The unfortunate omission of two common ditch and hedge plants, *Arenaria trinervia* and *Myosotis cæspitosa*, noted at once by Mr. W. Whitwell's customary acumen, do not mar the picture to which they are but as a few strokes in a corner of the foreground.

This Flora is charming in style as well as great in character. There is a felicity of phrase and allusion in the notes and descriptive observations, the essentials without the immaterial being subtly arrayed for the reader, which will enable him at near view to understand a chine, or glen, or hollow lane much better than might be thought possible; for Tabley understood, like Kingsley, how many and close are the inter-dependencies between soil, configuration, and investiture with apparently haphazard kinds and hues of vegetation. It cannot be too often repeated that just as geology is the groundwork of scenery, so topographic botany enables one to look with enlightenment on the coat of many colours worn by Flora in the passing seasons; for just as Lord De Tabley could not help carrying his botany into his verse, so he could not avoid infusing his science description with the poetic aroma, thereby conferring on both a distinctive

vraisemblance carrying a kind of conviction with it, somewhat after the nature-studied method of the late Lord Tennyson. He saw, we would repeat, so clearly how one thing in this world hangs on some other thing, how nothing really stands absolutely alone. The late Archer-Briggs' *Flora of Plymouth* is the only work that can compare with it in this conjunction of qualities. The dominant note is a fearless, unbiassed accuracy, and it is struck in the very first paragraph, where, dealing with the *Clematis*, Traveller's Joy, we read: 'Its garden origin with us (in Cheshire) is always obvious. A good test species of Mr. Watson's infer-agrarian zone, its initial absence from our county shows that we have *not* a Southern Flora to deal with. The plant fails at the bordering counties, Stafford and Salop, and occurs no higher in Britain as a native.' Over and over again, praiseworthy is the restraint shown; never an attempt to strain a point in favour of a claim to indigenity, or inclusion, so that the words 'without comment,' often appended to pre-existent records, acquire a peculiar force.

An enthusiast (as the writer admits, while claiming to be something judicial also) might expatiate over many pages on the vividity and convincing character of the botanical picture wrought in with many strokes of true genius, coupled—rarest conjuncture of all—with a sure flair for the most striking way of throwing the light on the fact.

As a letter writer, Lord De Tabley was, in a way, inimitable. He called field-collectors of Rubi 'bramblers,' suspecting a dying-out, seemingly degraded form of the raspberry, *Rubus Leesii*, to be the original and primordial *typus*—the opinion of a young Swedish rubologist, Areschoug—and added as his version of the Latin tag, 'Life is short and brambles interminable.'

One or two evidences we have that the Flora is not quite up to date; and these incompletions point the time when ill-health and increasing responsibilities made the hand loose its hold on the reins of detail, held up to then in so sure a grip. Certain points with regard to suggestive varieties, with a significant distribution, appear to have been neglected. Those widely diverging forms of the Spurrey (*sativa* and *vulgaris*) in which we have, as it were, Evolution 'caught in the act,' though both in evidence in Chester fields, lack the elucidation one looked for at such hands.

As for Changes, as one would expect from the proximity of Birkenhead, chemic Runcorn, and octopoid hives of industry, 'Ichabod' is the epitaph with regard to many dozens of species

and localities along the littoral and riparial county borders; but, as was grandiloquently yet not untruly said by Leo Grindon nigh half a century ago, 'the right-onward furrow of a generous utility' must outweigh the natural rights to existence of a thousand wild-flowers!

Interspersed in the book are some quaint economic informations laid to the door of empiric fancy or superstition: Ragwort, we read (p. 182), 'is supposed by Farmer Old-Style to be a test plant of good-cheese-producing pasturage.' This is true enough, as the milk off old, fine mushroom turf proves the reverse in its tough, not readily greening 'wangby,' that is, poor cheese. The aromatic quality in the *Senecio Jacobæa,* another one of the genus, being esteemed in the milk-fever of cattle, gives a peculiar ethery smack to cheese, and it is by no means so unsavoury as it is untidy in its weedy, chrysanthemoid appearance. Like several other herbs, it affects milk not only in flavour, but 'renneting,' curding it sooner than fattier samples off clean lush pasture.

Of the Bilberry (*Vaccinium Myrtillus*) our author (p. 198) quotes Watson—I think too hastily—in his assertion that it is one of the species that, if allowed, would overrun Britain and form with Heather and Crowberry much of the phytognomic character of its vegetation. Here an apprehension of the gradual natural change coming over the surface, due to varying environments in different areas, has not been sufficiently taken into account. Bilberry is a tenacious, 'strong' species; but its migrating powers are obviously limited, and its seeds are not everywhere in the soil beyond the coal-measure grit areas, or the silurians, and the influence of their disintegrations; and after a long experience in Lincolnshire, one's doubt of the entire truth of Watson's dictum is deepened, for it is on the whole disappearing in England (off Dartmoor and the wolds in part) south of the Mersey and Humber. In Lincoln great tracts covered with *Erica cinerea* and Golden Rod (*Solidago*) lack a trace of it; and historic evidence of its ever having had a marketable quantitative existence are also wanting.

These microscopic flaws, and some few others of omission hardly detract at all, however, from the pleasure to be derived from a perusal of this most captivating book.

The work is well bound, has a good map, and a fine electrotype portrait of Lord De Tabley; *but* the Blackberry spray in gold leaf on the cover is not, alas, with certainty referable to *Rubus Warrenii* or any other aberrant form known to science.

THE MODERN TENDENCY OF MYCOLOGICAL STUDY.

AN ADDRESS

DELIVERED AT THE YORKSHIRE FUNGUS FORAY OF 1899.

GEORGE MASSEE, F.L.S.,

Royal Herbarium, Kew.

The morphological method of research, rendered possible by the perfection of the microscope, combined with the insight derived from pure cultures, initiated by DeBary, have within the past twenty-five years completely revolutionised the study of Fungi. Old schemes of classification have been ruthlessly—perhaps too precipitately—swept away and new arrangements substituted. Those who first commenced the study of Fungi under the new dispensation indicated above have no qualms of conscience; on the other hand, those who entered the field under the old regime, and who consequently absorbed the Friesian scheme of classification so thoroughly that it became an integral part of their being, perhaps naturally resent all innovations, and depending on their temperament and stock of knowledge, challenge such departures from the old love on every possible occasion, Nevertheless, all who desire to know more about Fungi than is conveyed by a bald name and such as do not are not mycologists in any sense of the term—must of necessity admit that all additions to our knowledge have been made by those who have utilised both modes of research, and I can only suggest that if still greater pleasure is to be gained from the study, it can only be secured by accepting the inevitable, which means the revelations made and to be made by morphological and culture methods, as compared with deductions derived from naked-eye or pocket-lens observations.

That modern ideas are being accepted by all classes of mycologists is proved by the fact that heteroecism is generally accepted; the old supposed genera *Uredo*, *Æcidium*, etc., have gone for ever, their departure being in several instances precipitated by the researches of one the loss of whom from our midst we all deplore.

In the Hymenomycetes, a group perhaps the least disturbed by modern research, the microscope has proved of value in the discrimination of species; having in several instances shown that forms considered as entities by the old authors include more than one species universally acknowledged by systematists at the present day, as in the well-known instances of *Agaricus rimosus* Fries, and *Clavaria inæqualis* Fl. Dan., each of which

embodies two distinct species characterised entirely by microscopic features. The presence or absence of cystidia, form of basidia, also the number of sterigmata they bear are also microscopic features of systematic value in the same group of fungi.

From a broad point of view modern research has not very materially affected species, in most instances the additional microscopic characters going to confirm the opinion of old authors, especially in the Basidiomycetes, which received most attention at their hands. This statement, which is true of thousands of species, points to a condition of things which is much to be deplored, namely, the comparative neglect of naked-eye characters by members of the new school, who frequently boast that a mere fragment examined microscopically is sufficient for the determination of a species. This may in many instances be true, but evidence is by no means lacking to prove that such determinations have frequently resulted in disaster. Perhaps nowhere in the vegetable kingdom are species more clearly defined than in the Agaricineæ, or even in the fungi as a whole, but as in other groups of organisms there is no royal road to this knowledge, which can only be acquired by long-continued macroscopic and microscopic observation. As a rule morphologists and biologists lack this power, sometimes even essaying to scorn it, consequently the material they investigate is usually considered as new to science, and inadequately described, or if an old species, is too frequently incorrectly determined, as indicated by such names as *Peziza Wilkommii*, *Trametes radiciperda*, etc.

When morphologists and systematists are more in touch and sympathy with each other there will be less literature, but what is written will be of more value, as everyone then will be certain as to the exact species discussed, which unfortunately is by no means the case at the present day.

As already stated, species are not disturbed to any extent by morphological investigations, but when we come to the affinities of species and groups, everything is topsy-turvy, compared with old arrangements, which in many instances have little more than antiquity and prejudice as their sheet-anchor. On the other hand, the latest schemes of affinity can only be considered as tentative, numerous brilliant modern discoveries from repeated confirmation must be accepted as facts of great importance; the interpretation of these facts is as yet mostly a personal opinion, which will undoubtedly be modified from time to time as our knowledge increases. On one point, however, all are agreed—that no natural scheme of classification can possibly be formu-

lated from the sum of characters derived from an examination of fully developed and mature organisms.

Quite recently it has been shown that in *Stilbum vulgare*, a species hitherto considered as a typical Hyphomycete, the spore-bearing bodies resemble in structure the basidia characteristic of a section of the Basidiomycetes, hence *S. vulgare* has been placed by the author of this discovery amongst the last named group. Still later it has been found that another *Stilbum*, called *S. fasciculatum*, has also basidia-like structures bearing the spores, and it is quite probable, from analogy, that all the hundred and odd species known throughout the world agree in this point of structure, and hence, according to Juel, should be ranked amongst the Protobasidiomycetes. Now it is known that *Stilbum fasciculatum* is a form-species only, and is in reality the conidial form of a species of *Nectria*, an ascigerous fungus, hence, if Juel's idea is correct, we are face to face with an entirely new revelation, proving that an ascigerous fungus has a basidiomycete as its conidial condition. Further research is necessary before this point can be considered as settled.

Again, Brefeld sees in the organs bearing the spores in the Ustilagineæ, the 'smut' and 'bunt' of our cereals, structures resembling in appearance the basidia of the Protobasidiomycetes, hence in his scheme of classification the Basidiomycetes as a group are considered as having much affinity in common with the 'smuts.'

These ideas may prove eventually to be correct or otherwise; but it must be distinctly understood that in the event of their being shown to be wrong, and that in certain instances analogy has been mistaken for homology, this does not invalidate the principle, but only means that certain facts have been misinterpreted.

NOTE—FUNGI.

***Geaster bryantii* at Dinsdale.**—On the 13th of December 1898 I sent to Mr. Manson some 'Starfish Fungus.' The specimens were found growing on a box containing, as far as I knew, only ordinary soil, and situate in the greenhouse at Dinsdale Rectory. The specimens were forwarded per the agency of Mr. Best and Mr. Roebuck to the Secretary of the Yorkshire Mycological Committee, Mr. Charles Crossland, F.L.S., of Halifax, who promptly reported that he was very pleased to see the Earth Stars, which belonged to the Gastromycete group of the Basidiomycetes. The name is *Geaster bryantii* Berk. (Berk. Engl. Flora, Vol. 5, p. 300; Outlines, p. 300; Cooke, Handbook, No. 1073; Massee, Monograph of British Gastromycetes, p. 77, fig. 56). This is a most interesting species; there are about three or four others something similar, but this is distinguished from them by the distinct rim round the top of the pedicel which supports the endoperidium in which the spores are contained.—W. F. Keating Stock, Darlington, 13th December 1899.

CLEVELAND NATURAL HISTORY.

Cleveland Naturalists' | Field Club. | — | Record of Proceedings, | 1896, 1897, 1898. | — | Price One Shilling. | — | Middlesbrough: | Jordison & Co., Ld., Printers and Publishers | — | 1899. [Demy 8vo., 52 pages, in paper covers].

This is a record of admirable work by the members of a club that has never failed to recognise the high value of local investigation, and which does not yield to any temptation to stray beyond the limits of its own district so far as publication is concerned. The archæological side of the Club's work is represented by a beautiful photograph of 'Whorlton (Holy Cross)' and a continuation of Mr. R. Lofthouse's account of the Remains of Norman Architecture in Cleveland Churches, which the photograph illustrates. There is a valuable paper by Mr. W. Y. Veitch on 'Prehistoric Middlesbrough,' illustrated by photographs of skulls found in the neighbourhood. The Rev. John Hawell, M.A., F.G.S., gives a list of the Mollusca of the Cleveland district, including the results of the work of many collectors, both of marine and of land and freshwater species. Mr. T. Ashton Lofthouse then follows with a narrative account of Lepidoptera noticed in Cleveland during 1896, and Mr. M. L. Thompson gives a report on the Coleoptera observed in Cleveland in the years 1896, 1897, and 1898. Then follow Ornithological notes for 1896, 1897, and 1898 by Mr. R. G. Clayton and Mr. R. Lofthouse, and similar notes on Mammalia and Fishes by Mr. Clayton. The whole forms a series of most valuable papers and records which will always be indispensable for reference, and the Cleveland Field Club and its active body of members are to be most heartily congratulated on the results they have achieved.

NOTE—MOLLUSCA.

***Limax cinereo-niger* in Cheshire.**—In Cheshire this slug appears to be restricted to the hilly region in the east of the county, and is not uncommon in several places in the Goyt Valley between Marple and Errwood Hall. In May last I took it in a new locality, the Dane Valley at Wincle, where I found young examples beneath the bark of fallen ash trees in the woods.—CHAS. OLDHAM, Alderley Edge, 22nd September 1899.

NOTE—MAMMALIA.

***Lepus europæus* in Lakeland.**—Are black Hares in general common? The ordinary Hare is not common hereabouts, according to my experience and the gamekeeper's statement; but on 6th July I had the pleasure of watching four together. They were feeding in a small upland pasture that is beloved of wild creatures, for it is almost enclosed by sheltering woodlands. It was about 5.30 p.m. of a hot day, and they were engrossing in nibbling, resting the body on the ground as they ate, or changing ground with quick, light springs. Two were entirely black but for the thin ears, through which the light shone, and naturally were quite conspicuous; the others, a full-grown and a young one, would not have caught my attention from the distance at which I was but for their black companions.—MARY L. ARMITT, Rydal, 23rd September 1899.

LINCOLNSHIRE DIPTERA:

ADDITIONS TO MR. PERCY H. GRIMSHAW'S PRELIMINARY LIST IN 'THE NATURALIST' FOR MAY AND JUNE 1898.

Rev. A. THORNLEY, M.A., F.E.S., F.L.S.,

Vicar of South Leverton, Notts.

The remarks with which I prefaced the Notts List of Diptera will apply here also. I should like, however, to acknowledge the great help I have received from the Rev. E. A. Woodruffe Peacock, F.L.S., Vicar of Cadney, Lincolnshire, and his brother. The number of new records for the county is 60; this will bring the total records up to 255. I hope that many more workers will turn up, and this list be rapidly increased.

Fam. BIBIONIDÆ.

****Dilophus febrilis*** L. Linwood Warren, 1898 (Peacock). Hibaldstow, 1898 (Peacock). Cadney, one ♀, 1898 (Peacock).

Dilophus femoratus Mg. Linwood Warren, one ♀, 1898 (Peacock).

****Bibio venosus*** Mg. Linwood Warren, one ♀, 1898 (Peacock).

Fam. CULICIDÆ.

****Culex pipiens*** L. Epworth, one ♀, 14th July 1898 (L.N.U.).

Fam. PTYCHOPTERIDÆ.

Ptychoptera albimana Fab. Freshney Bogs, Great Cotes, one ♀, 21st June 1898 (Thornley).

Ptychoptera contaminata L. Cadney, 1898 (Peacock).

Fam. LIMNOBIDÆ.

****Limnobia nubeculosa*** Mg. Ashby, 1898 (Dr. Cassal).

Limnobia tripunctata F. Cadney, one ♀, 1898 (Peacock).

****Limnophila lineola*** Mg. Scotton Common, one ♀, 22nd June 1898 (Thornley).

****Limnophila lineolella*** Verr. Epworth district, one example, 14th July 1898 (Peacock). [Marked (?) by Mr. Grimshaw.]

****Limnophila ferruginea*** Mg. Scotton Common, one ♂, 22nd June 1898 (Thornley).

****Pedicia rivosa*** L. Freshney Bogs, Great Cotes, one ♀, 21st June 1898 (Thornley).

November 1899.

Fam. TIPULIDÆ.

Pachyrrhina histrio F. Freshney Bogs, Great Cotes, one ♀, 13th July 1898 (Thornley). Epworth district, one ♀, 14th July 1898 (L.N.U.).

****Pachyrrhina maculosa*** Mg. Torksey, one ♀, June 1897 (Thornley). Cadney, one ♀, 1898 (Peacock).

****Tipula nigra*** L. Freshney Bogs, Great Cotes, two ♂s, 21st June 1898 (Thornley).

Tipula lunata L. Freshney Bogs, Great Cotes, two ♀s, 21st June 1898 (Thornley).

Tipula gigantea Schrk. Grantham, 1898 (Peacock). Freshney Bogs, one ♀, 21st June 1898 (Thornley).

****Tipula oleracea*** L. Epworth, 14th July 1898 (L.N.U.).

Tipula ochracea Mg. Cadney, 1898 (Peacock). Epworth, one ♀, 14th July 1898 (Thornley).

Tipula lutescens F. Ashby, 1898 (Dr. Cassal).

Fam. STRATIOMYIDÆ.

****Nemotelus pantherinus*** L. Freshney Bogs, Great Cotes, one ♂, 13th July 1898 (Thornley).

****Nemotelus nigrinus*** Fln. Freshney Bogs, one ♂ and one ♀, July 1898 (Thornley).

****Oxycera trilineata*** F. Grimsby, in garden, 1897 (A. Smith).

Sargus nubeculosus Ztt. (Var. of *S. cuprarius* L.). Cadney, 1898 (Peacock).

Chloromyia formosa Scop. Cadney, 1898 (Peacock). Ashby, 1898 (Cassall). South Kelsey, 9th July 1898 (Peacock). Freshney Bogs, one ♂ and two ♀s, 13th July 1898 (Thornley).

Microchrysa polita L. Cadney, 1898 (Peacock).

****Beris vallata*** Forst. Freshney Bogs, Great Cotes, common, on 21st June 1898 (Thornley).

Fam. TABANIDÆ.

Hæmatopota pluvialis L. (The Clegg). Freshney Bogs, one ♀, 13th July 1898 (Thornley). Epworth, 14th July 1898 (L.N.U.).

Chrysops cæcutiens L. Freshney Bogs, Great Cotes, one ♂ and two ♀s, 13th July 1898 (Thornley).

Leptis scolopacea L. Grantham, two ♀s, 1898 (Peacock). Scotton Common, one ♀, 1898 (Thornley). Freshney Bogs, 13th July 1898 (Thornley).

Leptis tringaria L. Ashby, 1898 (Dr. Cassal). Freshney Bogs, one ♀, 13th July 1898 (Thornley).

****Leptis conspicua*** Mg. Freshney Bogs, Great Cotes, one ♂, 13th July 1898 (Thornley).

Chrysopilus aureus Mg. Freshney Bogs, common, 13th July 1898 (Thornley).

Fam. ASILIDÆ.

****Dioctria atricapilla*** Mg. Epworth, one ♀, 14th July 1898 (Peacock).

Dioctria rufipes DeG. Cadney, 1898 (Peacock).

Fam. THEREVIDÆ.

Thereva nobilitata F. Epworth, one ♀, 14th July 1898 (Peacock).

****Thereva bipunctata*** Mg. Epworth, one ♀, 14th July 1898 (Peacock).

Fam. CYRTIDÆ.

****Paracrocera globulus*** Pz. Scotton Common, one ♂ and two ♀s, from birch trees, 22nd June 1898 (Thornley).

Fam. EMPIDÆ.

****Ramphomyia sulcata*** Fln. Linwood Warren, one ♂, 1898 (Peacock).

****Ramphomyia geniculata*** Mg. Scotton Common, ♂ and ♀, 22nd June 1898 (Peacock).

Empis tesselata F. Freshney Bogs, 1898 (Thornley). Linwood Warren and Cadney, 1898 (Peacock).

Empis livida L. Freshney Bogs, 1898 (Thornley). Cadney and South Kelsey, 1898 (Peacock).

Empis trigramma Mg. Cadney, 1898 (Peacock).

****Empis opaca*** F. Cadney, 1898 (Peacock). Linwood Warren, 1898 (Peacock).

****Hilara maura*** F. Scotton Common, 1898 (Thornley).

Tachydromia flavipes Fab. Cadney, one ♂, 1898 (Peacock).

Fam. DOLICHOPODIDÆ.

****Dolichopus picipes*** Mg. Freshney Bogs, one ♂, 13th July 1898 (Thornley). (This species is marked by Mr. Grimshaw with a !.)

Dolichopus æneus DeG. Grantham and Cadney, 1898 (Peacock).

**Gymnopternus cupreus* Fln. Scotton Common, one ♂, 1898 (Peacock).

**Porphyrops elegantulus* Mg. Scotton Common, one ♂, 1898 (Peacock).

**Scellus notatus* F. Cadney, one ♂, 1898 (Peacock).

Fam. SYRPHIDÆ.

Chrysogaster hirtella Lw. (=***macquarti*** Lw.). Freshney Bogs, 13th July 1898, very common (Thornley).

**Chilosia chloris* Mg. Freshney Bogs, Great Cotes, one ♀, 21st June 1898 (Thornley).

Chilosia flavimana Mg. Cadney, 1898 (Peacock).

Chilosia œstracea L. Cadney, one ♂, 1898 (Peacock).

**Chilosia proxima* Ztt. Cadney, one ♂, 1898 (Peacock). [Marked by Mr. Grimshaw with a ! .]

Melanostoma mellinum L. Cadney, 1898 (Peacock).

Platychirus manicatus Mg. Cadney and Linwood Warren, 1898 (Peacock). Ashby, 1898 (Dr. Cassal).

Platychirus peltatus Mg. Freshney Bogs, Great Cotes, two ♀s, 21st June 1898 (Thornley).

Platychirus scutatus Mg. Cadney, 1898 (Peacock).

Platychirus scambus Stoeg. Freshney Bogs, 13th July 1898 (Thornley).

Syrphus maculicornis* Ztt. (=*auricollis*** Mg.). Ashby, 1898 (Dr. Cassal).

Syrphus bifasciatus F. Cadney and Hibaldstow, 1898 (Peacock).

Syrphus luniger Mg. Cadney, 1898 (Peacock). Ashby (Dr. Cassal).

Syrphus ribesii L. Hibaldstow, 1898 (Peacock). Ashby, 1898 (Dr. Cassal). Grimsby, 1897 (A. Smith).

**Syrphus lunulatus* Mg. Hibaldstow, one ♂, 1898 (Peacock).

Sphærophoria scripta L. Linwood Warren, 1898 (Peacock).

**Sphærophoria picta* Mg. Scotton Common, three ♂s, 1898 (Thornley).

Rhingia rostrata L. Cadney and Linwood Warren, 1898 (Peacock).

Volucella bombylans L. Cadney (Peacock).

Eristalis tenax L. Cadney, 1898 (Peacock).

Eristalis arbustorum L. Cadney and Hibaldstow, 1898 (Peacock). Ashby, 1898 (Dr. Cassal). Grimsby, 1897 (A. Smith).

Eristalis pertinax Scop. Cadney and Hibaldstow, 1898 (Peacock).

****Myiatropa florea*** Rnd. Torksey, one ♀, 10th September 1898 (Thornley).

Tropidia milesiformis Fln. Freshney Bogs, Great Cotes, 13th July 1898 (Thornley).

Xylota segnis L. Freshney Bogs, Great Cotes, one ♂, 13th July 1898 (Thornley).

Syritta pipiens L. Scotton Common, 1898. Freshney Bogs, 1898 (Thornley).

****Chrysotoxum arcuatum*** L. Cadney, one ♀, 1898 (Peacock).

****Chrysotoxum bicinctum*** L. Freshney Bogs, Great Cotes, one ♀, 13th July 1898 (Thornley).

Leucozona lucorum L. Cadney, two examples, 1898 (Peacock).

Fam. CONOPIDÆ.

Sicus ferrugineus L. Ashby, one example, 1898 (Dr. Cassal).

Fam. TACHINIDÆ.

****Exorista cheloniæ*** Rnd. Ashby, 1898 (Dr. Cassal). [Several specimens which Dr. Cassal bred from *Chelonia caja* larvæ; and which agree very well with the description of the above in Dr. Meade's synopsis of the Tachinidæ. Alfred Thornley.]

****Tachina rustica*** Mg. Cadney, September 1897 (Peacock). Somerby, 1897, one ♂, October (Peacock). Freshney Bogs, Great Cotes, 13th July 1898 (Thornley).

In the list received from Mr. Grimshaw this species is marked (!); but they agree perfectly well with a specimen I sent to Dr. Meade, taken in the New Forest, and returned by him as *T. rustica*.

****Tachina brevipennis*** Mg. Freshney Bogs, Great Cotes, 21st June 1898 (Thornley).

This appears to be a very rare species, and is not mentioned in Mr. Verrall's List; but is described by Dr. Meade in the Ent. M. Mag., Vol. 28, p. 38.

Fam. DEXIDÆ.

Thelaira leucozona Pz. Freshney Bogs, Great Cotes, one ♀, 13th July 1898 (Thornley).

Fam. SARCOPHAGIDÆ.

Sarcophaga carnaria L. Cadney, 1898 (Peacock). Freshney Bogs, 21st June 1898 (Thornley). Grimsby, in garden (A. Smith).

Sarcophaga melanura Mg. Cadney, one ♀, 1898 (Peacock). Marked (!) by Mr. Grimshaw.

Fam. MUSCIDÆ.

Lucilia cæsar L. Freshney Bogs, 14th July 1898 (Thornley). Cadney, 1898 (Peacock). Ashby, 1898 (Cassal).

Calliphora erythrocephala Mg. Freshney Bogs (Thornley). Cadney (Peacock).

Calliphora vomitoria L. Ashby, 1898 (Dr. Cassal).

****Mesembrina meridiana*** L. Hibaldstow, 1898 (Peacock).

Graphomyia maculata Scop. Torksey, ♂s common on 10th September 1898 (Thornley).

Morellia hortorum Fln. Freshney Bogs, June and July 1898 (Thornley). Cadney, 1898 (Peacock).

Stomoxys calcitrans L. Freshney Bogs, June and July 1898 (Thornley). Cadney, 1898 (Peacock). South Kelsey, 9th July 1898 (Peacock).

Fam. ANTHOMYIDÆ.

****Polietes lardaria*** F. Freshney Bogs, June and July 1898 (Thornley).

Hyetodesia incana W. Cadney, 1898 (Peacock).

Hyetodesia lucorum Fln. Cadney, 1898 (Peacock).

Mydæa impuncta Fln. Cadney, July 1898 (Peacock).

Hydrotæa irritans Fln. Freshney Bogs, June and July 1898 (Thornley).

Ophyra leucostoma W. Cadney, 1898 (Peacock).

****Drymia hamata*** Fln. Cadney, 1898 (Peacock).

****Hydrophoria conica*** W. Ashby 1898 (Dr. Cassal).

Hylemyia strigosa F. Cadney, one ♂, 1898 (Peacock). South Kelsey, 9th July 1898 (Peacock).

****Hylemyia variata*** Fln. Cadney, 6th October 1898 (Peacock).

****Homalomyia hamata*** Mcq. Cadney, one ♂, 1898 (Peacock).

****Homalomyia scalaris*** F. Cadney, 1898 (Peacock). Freshney Bogs, 13th July 1898 (Thornley).

****Cœnosia elegantula*** Rnd. Epworth district, 14th July 1898 (L. N. U.).

Fam. CORDYLURIDÆ.

Scatophaga stercoraria L. Great Cotes, 1898 (Cordeaux and Peacock). Ashby (Dr. Cassal).

****Hydromyza livens*** F. Mablethorpe, June 1897 (Thornley).

Fam. SCIOMYZIDÆ.

****Sciomyza schœnherri*** Fln. Great Cotes, one ♂, 1898 (Cordeaux and Peacock).

Tetanocera elata F. Grantham, one ♂, 1898 (Peacock). Freshney Bogs, Great Cotes, four ♂s, 21st June and 13th July 1898 (Thornley).

Tetanocera sylvatica Mg. Freshney Bogs, Great Cotes, one ♂, 21st June 1898 (Thornley). South Kelsey, 9th July 1898, one example (Peacock).

Tetanocera reticulata L. Freshney Bogs, Great Cotes, one ♀, 21st June 1898 (Thornley).

****Limnia rufifrons*** F. Scotton Common, one ♀, 22nd June 1898 (Thornley).

****Elgiva dorsalis*** F. Great Cotes, one ♂, 1898 (Cordeaux and Peacock).

****Sepedon spinipes*** Scop. Hartsholme, Lincoln, Sept. 1898 (Thornley).

Fam. PSILIDÆ.

****Psila fimetaria*** L. Linwood Warren, 1898 (Peacock).

****Psila nigricornis*** Mg. Cadney, one example, 1898 (Peacock).

Fam. ORTALIDÆ.

Ptilonota centralis Fab. Linwood Warren, 1898 (Peacock).

****Pteropæctria frondescentiæ*** L. Freshney Bogs, Great Cotes, very common, 21st June 1898 (Thornley).

****Pteropæctria nigrina*** Mg. Cadney, one ♂, September 1897 (Peacock).

****Ceroxys crassipennis*** F. Freshney Bogs, Great Cotes, 13th July 1898 (Thornley).

Platystoma seminationis F. Cadney, 1898, common (Peacock and Thornley). Grantham, 1898 (Peacock).

Seoptera vibrans L. Cadney, 1898 (Peacock).

Fam. TRYPETIDÆ.

****Tephritis bardanæ*** Schrk. Cadney, one ♂, 1898 (Peacock).

Fam. LONCHÆIDÆ.

Palloptera arcuata Fln. Linwood Warren, 1898 (Peacock).

Fam. SAPROMYZIDÆ.

Lauxania ænea Fln. Cadney, September 1897 (Thornley).

****Sapromyza apicalis*** Lw. Mablethorpe, June 1897 (Thornley).

Fam. OPOMYZIDÆ.

****Balioptera combinata*** L. Mablethorpe, June 1897 (Thornley).

Opomyza germinationis L. Freshney Bogs, 13th July 1898 (Thornley).

Fam. SEPSIDÆ.

Sepsis cynipsea L. Cadney, July 1898 (Peacock).

Fam. PHORIDÆ.

****Phora opaca*** Mg. Great Cotes, one ♀, 1898 (Cordeaux and Peacock).

Fam. MICROPEZIDÆ.

Micropeza corrigiolata L. Cadney, 1898 (Peacock).

BOOK NOTICES.

We have received from Messrs. **R. Friedländer & Sohn,** of Berlin, the bound volumes of their '**Naturæ Novitates**' for 1897 and for 1898. No words of ours are needed to commend to workers in all branches of science this exhaustive and indispensable account of the literature of their subjects for the years specified. Each year's volume, in paper, is priced 4s.

'**Sweet-Briar** | **Sprays** | being | Posies Pluckt in a Random Walk | through this still beautiful | England of Ours. | By | **Harry Lowerison** | . . | . . | . . | . . | . | . . | Francis Riddell Henderson | . . | London' is a little book of irregular size, dated 'Hay-Harvest, 1899,' and running to over 150 pages. It is a series of Jeffreysian essays arranged according to the months in which they were written. The localities referred to are diverse, and one or two of the chapters are of interest to North-Country naturalists, as, for example, that localised at Thirlwall, in Northumberland, and another by the Trent at Gainsborough. The price is 1s. 6d. net.

Everyone's | **Handbook of British Breeding Birds.** | — | When and Where their Nests are built: | what they are composed of: | the Number and Colour of their Eggs: | the Food they eat; | the Nature of their Vocal Powers; | and some Local and old-fashioned names, | by | **W. Percival-Westell** | Author of | "all about Birds," etc. | With a Preface by the late Rt. Hon. W. E. GLADSTONE, and an | Introduction by CLAUDE ST. JOHN. | Illustrated. | London | Henry J. Drane. | Salisbury House, Salisbury Square, Fleet Street, E.C.

This is a little square book of 188 pages, in which the author disclaims any attempt to cater for any but those who wish to acquire rudimentary knowledge of birds. Its scope is sufficiently denoted in the extended title-page, and we may but briefly add that the order adopted is the alphabetical one of English names.

THE CHEMISTRY OF THE LAKELAND TREES.

P. Q. KEEGAN, LL.D.,
Patterdale, Westmorland.

In view of the eminent interest and importance of the subject, and of the considerable attention now bestowed in this country on the science and art of Forestry, I have deemed it advisable to supplement the account given in 'The Naturalist' for June 1898, pp. 181-87, of the chemistry of the Lakeland trees by a further notice of a few other trees frequently to be met with in that enchanting region. Commencing as before with the Gymnosperms, I will now consider the

Scotch Fir. ***Pinus sylvestris.*** This is a true and sturdy native of the district. 'Formerly the whole country,' says Wordsworth, 'must have been covered with wood to a great height up the mountains; where native Scotch Firs must have grown in great profusion.' Unfortunately the profusion is not quite so great to-day; but still there do exist some spots where 'a sombre cloud of pine-tree foliage' is tolerably forcibly suggested. In fact, this Pine is relieved very conspicuously indeed in several places by its dark and lofty aspect, its 'massy dome of sombre foliage' in contrast with and against the background of the lighter and more vividly-tinted Spruce, Larch, Birch, etc., which zone the mountain sides. The great economic value of the tree as a source of resin, turpentine, and timber has stimulated chemical research on the part of several German investigators. The more interesting facts brought to light are that in winter there is no starch at all in the wood, pith, bark, or leaves; in March there is much starch, especially in the older wood and in the leaves; and during the summer the wood is particularly poor in fatty matter. The largest amount of resin occurs in the wood of the root, and the smallest in the bark. The latter contains about 7 per cent. of a highly oxygenated tannin and its phlobaphene; also wax, quinovic acid, sugar, and a yellow bitter matter called pinipicrin. According to Kawalier, 'the wood contains resin, turpentine, and mucilage, but has no tannin, bitter principle, starch, wax, or citric acid.' A little free phloroglucin is found in the pith and medullary rays. I have not succeeded in isolating coniferin from this tree, although according to macro-chemical reactions it certainly exists there. The leaves contain little or no carotin, but have large quantities of a yellow fat, wax, and resin (the whole, with the chlorophyll, contributing to impart the very sombre shade), also rutin, mucilage, sugar, quinovic acid, with small quantities of tannin and citric acid; the volatile oil (fir-wool oil) is not the same as

turpentine, it is of a greenish-yellow colour and exhales an odour recalling that of a mixture of lavender and lemon.

Aspen. ***Populus tremula.*** It seems rather difficult to believe that this species is truly native and prehistoric, yet there is no doubt whatever about the fact, its occurrence being recorded as 'frequent up to 900 feet in woods and hedges.' It is extremely hardy and adaptable, although rather light-needing on account of its sparse leafage. The most remarkable feature about the Poplars is that they are fat-trees, whereas the Willows are starch-trees, i.e., while in the former the starch almost entirely disappears from all parts during the winter months, in the latter the starch remains at all times in the wood and pith, but it vacates the bark in winter. The Aspen is especially distinguished by the presence in its bark and leaves of a glucoside called populin $C^{20}H^{22}O^{8}$, which is allied to salicin (found in numerous Willows), but it contains the benzoyl radicle (i.e., it yields benzoic acid as well as saligenin on decomposition by dilute acids), has a sweet taste, decomposes with far greater facility, and is much less soluble in water and alcohol. In other respects the chemical composition of the two genera of the sub-order Salicaceæ is pretty similar. The 'golden perch of Aspen spray' in October is explained by the large amount of carotin which the leaves contain.

Oak. ***Quercus robur.*** This grand national tree flourishes in sturdy and stately grandeur in the woods and among the crags, the mountain winds contributing to impart a peculiar character of picturesque intricacy to the curiously tortuous branchlets, twisting zigzagedly hereabouts even more than is their wont. As might be expected, this tree has been the subject of a vast amount of chemical research; but it is only recently that its power as a starch-producer has been fully recognised, and this is the reason of its special liability to be struck by lightning. It will hardly be necessary to give a full recital of the numerous and interesting constituents of so well-known a tree. The tannin of the wood is different from that in the bark and leaves, and approaches more decidedly that in the galls and acorns; it is what is called a digallic-methyl ester or a derivative of pyrogallol, whereas that of the bark and leaves is phlobaphenic and a derivative of pyrocatechin. The bark contains from 6 to about 15 per cent. soluble and insoluble tannin, the parenchyma of the bast and the primary cortex being especially rich; in the wood it occurs sparingly up to about 5 per cent. A trace of free gallic acid sometime occurs in the bark, which also contains phlobaphene, wax, pectin, levulin, quercite, starch, oxalate of calcium, and about 2 per cent. ash

rich in lime (and manganese in the best barks), but poor in potass and silica. The leaves are extremely interesting, being rich in tannin (even in the bud), carotin, wax, nitrogenous matters, and silica, but rather poor in fat, fibre, and ash; the actual amount of starch on analysis seems moderate, but the storing capacity of the tree for this substance is, in certain circumstances, altogether extraordinary. In this connection a casual mention might be made of the Beech, but as this tree is a decisive alien in Lakeland, and a by no means contented or prosperous one either, although decidedly vigorous locally, it must suffice to observe that it is much richer in oil and much poorer in tannin than the Oak, its grey, smooth bark is mailed with silica and charged with lime, and the redundant development of its foliage is attended with physiological consequences altogether unique.

Hazel. ***Corylus avellana.*** This true native is one of our commonest truly wild trees, or rather shrubs or bushes, flourishing in a characteristic tufted or 'concentrated' manner on banks, edging the wood-side; or in damp hollows overhanging some murmuring beck. The chemical analysis recalls somewhat that of the Alder, but the constituents are not developed in anything like the same strength. The bark contains a considerable quantity of a tannin like that in other Amentaceæ, and is associated with much phlobaphene and 'humus' matter. The very tough and close-grained wood is richly charged with starch, phloroglucin, and coniferin, together with a small amount of a tannin which is not the same as that in the bark. The leaves are rich in albumenoids, and have a full share of carbohydrates, also inosite, etc., but are rather poor in fibre and ash (which contains much silica, especially in the autumn); rutin and tannin amount to about 5 per cent., and the easy resolution of the latfer into high, nut-brown anhydrides (recalling the case of the Alder) forbids any brilliancy of autumnal livery on the part of the foliage. The tremendous activity of the chlorophyllian protoplasm of this bush is manifested not only by the richness of the wood in starch at all seasons, but by the very high, 67, percentage of oil contained in the nut, wherein it is intimately associated with a large quantity of albumenoids existing in three different states; sugars and a volatile aromatic substance also occur in this favourite comestible; the oil is pale yellow, drying, and consists mostly of olein, with a little palmitin, and is coloured greenish by nitric acid.

Sycamore. ***Acer pseudo-platanus.*** This tree is pronounced to be an alien in our district, and again it is said to be 'doubtfully a true native,' but at all events it is here both common and luxuriantly developed in plantations and about farmhouses up to 1,500 feet. As Wordsworth says, 'it has long been the

favourite of the cottagers, and with the Fir has been chosen to screen their dwellings.' In fact, the 'massy Sycamore that spreads in gentle pomp its honied shade' has claims upon the attention of the scientist no less than upon that of the poet; and I may add that it is a special favourite of my own, my earliest studies in plant analysis being devoted chiefly to this tree. It is often self-sown, and the seed has about 30 per cent. oil and 26 per cent. albumenoid, but no starch; these facts, however, do not indicate that it is a fat-tree, they only suggest that the attractive force and storage capacity for starch is locally deficient. The yellow flowers contain no carotin, but have abundant rutin and saccharine matter. The bark contains a considerable amount of waxy and fatty matter, and it is encrusted with silica; the phelloderm, collenchyma, and the bast parenchyma are rich in tannin, which is identical with that of the Horse-chestnut, and is conjoined with its phlobaphene and a small quantity of free phloroglucin; but the most remarkable constituent is a kind of saponin-glucoside which occurs about September apparently in some quantity, it dissolves in sulphuric acid with a dark red colour passing to violet red, with ultimately a deep blue granular deposit; with alcoholic HCl it yields a bright permanent pink solution; and with a solution of bromine in chloroform a bright red colour in a few minutes. The wood contains much coniferin and starch. The leaves are enriched with an abundance of carotin, wax, fat, and resin, and in the autumn the epidermis is encrusted with silica; in May a large quantity of quercitrin can be extracted from them, together with tannin and erythrophyll; mannite, cane-sugar, and about 4 per cent. starch are also to be found among the constituents of one of the most remarkable foliar organs of our woodlands.

Linden. ***Tilia intermedia.*** No chemical account of the trees of any British region would be complete if this one were passed over. It is frequently to be seen in the Lakeland parks and hedgerows, and although certainly not a native, it suits itself very conformably to the circumstances of its immigration. It is mentioned here only incidentally as a sort of foil or contrast chiefly in regard to the fact that, except the Walnut, it is the most fat-producing tree in our sylva. For about nine months of the year its wood teems with oil, and during winter there is no starch at all in the wood, pith, or bark. The quantity of mucilage in bark and leaves is exceedingly great; while the combination of volatile oil, sugar, mucilage, and carotin in the flowers constitutes a feast of delight sumptuous enough to account for the phenomenon of—

'The Lime, a summer home of murmurous wings.'

NOTES ON THE FLORA OF CHESHIRE.

ARTHUR BENNETT, F.L.S.,
Croydon, Surrey.

The publication of Lord De Tabley's Flora has added another to the list of Floras that are gradually giving the base on which to build future Floras of Britain, which will not be quite in the same groove as those gone by. Already the idea that is being so strongly worked out in America, with regard to what Hackel called the œcological conditions of a Flora, may perhaps be looked for in Britain before long; and the Cheshire Flora is one, among many now, that will contribute its quota to that Flora. The only thing one misses is the 'touch of the vanished hand' in its completion in this, like Mr. Prior's 'Flora of Hertfordshire,' the two botanists being in many respects much alike: careful as to what they admitted, and with good 'ideals' as to what a Flora should be.

In looking through the Cheshire Flora a few things occurred to me as perhaps worth noting, and as they make one or two additions to the Flora, they may be worth recording.

And I have also noted some omissions, which would have been no doubt explained had the author lived to complete his work. These are taken from the second edition of Watson's 'Topographical Botany' (1883).

Thalictum minus L. 4. I think the Little Eye specimens must be referred to Dumatier's *T. dunense*. But I am quite inclined to think we may have two forms on our coasts, especially in Scotland.

Nuphar pumilum DC. The Salopian plant is undoubtedly the true plant. I submitted specimens of it to the late Dr. Caspany, of Konisberg, who affirmed the name. One of these I then sent to Mr. Watson, and in a letter acknowledging its receipt, he remarks:—'Thanks for the specimen of *Nuphar pumilum* from Shropshire—a desirable one for my herbarium, having myself raised a query as to the certainty about the species there. It is curious that this species of the Highland lakes should occur in Shropshire and apparently not in any of the Welsh lakes.' 19, 11, '79. Since this date it has been found in Merioneth by the Rev. Ley.

Stellaria nemorum L. 1. Woods on the banks of the Etharrow at Mottram, W. I. Harman sp.

Spergula arvensis. *P. sativa* Bœnn. Field, Little Sutton, A. C. Lomax.

Vicia tetrasperma Mœnch. Roadside between Frankby and West Derby, Cheshire, W. Whitwell sp. Is West Kirby meant?

Agrimonia odorata Mill. 2. Wood, Rostherne Mere, September 1880, H. Searle sp.

Potentilla procumbens Sibth. 5. Chester Racecourse, Dr. N. L. Britton, sp., 7, 1888.

Cicuta virosa L. Near Dunham-on-the-Hill, Eddisbury Hundred, R. Brown sp.

Mentha arvensis L. Var. ***nummularia*** (Schreb.). 2. Rostherne Mere, 8, 1884, H. Searle sp.

Senecio vulgaris L. Var. ***radiatus.*** 4. Sandhills between Wallasey and Leasowe, S. Slater in 'Science Gossip,' p. 188, 1884.

Vaccinium Oxycoccos L. 3. Moss near Delamere, 23, 8, 1879, J. C. Melvill sp.

Monotropa Hypopitys. 'Chester,' Top. Botany.

Erythræa pulchella Fries. 4. The Horles, Seacombe, 9, 1869, J. H. Lewis sp.

Statice 'auriculæfolia Vahl.' *S. binervosa.* G. E. Smith. The var. *intermedia* Syme grows on Hilbre Island, August 1873, R. Brown sp., August 1873.

Statice bahusiensis Fr. Muddy shore of the river Mersey, between Eastham and Bromborough Pool, September 1876, R. Brown sp. The specimen, though not so typical as one of the original specimens from Hants, gathered by Mr. Notcutt, that I possess, is to be referred to the *S. rariflora* of Drejer, rather than to *S. Limonium.*

Chenopodium rubrum L. 4. Seacombe, C. A. Lomax.

Utricularia neglecta Lehm. 3. Characteristic specimens, in good flower, from 'Bolesworth, Cheshire, July 1857, A. Croall,' are in my herbarium. 6. I have a specimen under the name of '*U. major,* Wybunbury Bog, September 1875, Dr. J. Fraser.'

Utricularia minor L. 6. Wybunbury Bog, 26, 8, 1873, Dr. J. Fraser sp. Although not named at p. 242 in the Flora, this is recorded under Mr. Spark's name (in Garner's 'Staffordshire') at p. lxxxix.

Atriplex hastata L. 4. Bromborourgh, A. E. Lomax.

Atriplex deltoidea Bab. Field, Rock Ferry, A. E. Lomax.

Euphorbia portlandica L. 'Chester,' J. L. Warren, cat. Top. Botany. No note or remark in Flora.

Potamogeton densus L. 3. Delamere, August 1884, H. Searle, sp. Recorded in the 'Journal of Botany,' p. 140, 1886.

Not recorded in the Flora, at p. 286; the probability of its occurrence is noted. It is recorded for South Lancashire, Yorkshire, Derby, and Stafford; but neither for Salop, Denbigh, or Flint. The note in the Flora on this must be read in conjunction with the remarks in the preliminary explanations. If Potamogetons are distributed by birds this stands a much less chance than *P. crispus*, as its fruits are much more delicate, and do not survive so long to exposure, etc.

Potamogeton zosterifolius Schum. 5. River Dee, near Shoclack, Major Wolley Dod sp., August 1899. A good addition to the county Flora, it occurs in Derby!, Stafford!, Salop!, and in Yorkshire!, though not in the part adjoining Cheshire. I have seen no Welsh specimens, but it may perhaps be found in the Dee watershed.

Potamogeton Friesii Rupr. ('*P. mucronatus* Schrad.'). There is a Cheshire specimen of this in the herbarium of Mr. Charles Bailey, of Manchester.

Potamogeton pectinatus L. The remark on Mr. Hunt's September gathered specimens, as contrasted against September gathered ones of var. *scoparius* from Sussex, is instructive, as Mr. Fryer would place *scoparius* under *flabellatus*, and in this I agree.

Potamogeton flabellatus Bab. 4. 'In stagnis salsis, Wallasey,' A. E. Lomax sp.

Ruppia rostellata Koch. 4. Shallow pit on Bidston Marsh, Hundred of Wirral, 7, '75, R. Brown sp. Most certainly the *R. rostellata* of Syme's 'English Botany,' and not *spiralis*. The remarks on *Ruppia* in the Flora are not very clear as to what is meant.

Epipactis latifolia All. 3. Bolesworth, 9, 1860, A. Croall sp. Of the four specimens, one has very much narrower leaves than the others.

Juncus lamprocarpus Ehrh. The *J. nigritellus* of Don was probably really *J. alpinus* Vill. (see Beeby in 'Scottish Naturalist,' p. 92, 1887-8). The specimens usually named *nigritellus* in Britain are called by Dr. Buchanan 'forms in some instances approaching the var. *pauciflorus* of *lamprocarpus*.' In others they are simply dwarf *lamprocarpus*.

Juncus obtusiflorus Ehrh. 5. Near Chowley, 7, 1857, A. Croall sp. This was long before Mr. Webb gathered it, at or near the same spot. The author's remarks on the distribution of this plant are true in many counties; in Surrey I have only once gathered it, but in Norfolk, Suffolk, and Cambridgeshire it sometimes occurs by the

acre, the vegetation of the 'Broad' country in Norfolk especially being comprised of few species comparatively, while the numbers in some cases are immense.

Scheuchzeria palustris L. 6. This is one of our decreasing species. Some notes on its occurrence will be found in the 'Journal of Botany,' p. 380, 1, 1898. It seems to be entirely extinct in its Perthshire locality; and Mr. F. A. Lees seems to regard it as quite, or nearly so, in Yorkshire. The latest gathering I am aware of (other than Mr. Marshall's (1896)) is that of the late Mr. Beckwith in Salop in a new locality, whence he sent me specimens. As Mr. Sims ('Phytologist,' 2, 576, 1858) acknowledges to having gathered 'over 300 specimens in one day' in Perth, it must have been abundant there.

Carex teretiuscula Ehrh. The remarks on this Carex and its var., p. 321-2, are amply borne out by Mr. J. Bagnell's experience in Warwickshire; and on this point the remarks of Mr. Watson (Cyb. Britt., Vol. 3, 107, 1852) are very pertinent:—'If I rightly know that variety it occurred on Wimbledon Common, in Surrey, some few years ago, in *a drying up swamp.*'

Carex limosa L. 6. Wybunbury Moss, Herb. E. S. Marshall.

Carex strigosa Huds. 2. I have a specimen gathered by Dr. Wood in 'Cotteril Clough, May 1841.'

Carex fulva Good. Fields near Stump (?) Wood, 27, 8, 1881, H. Searle. I cannot read the word, it may be 'Stirrup?'

Carex riparia Curtis. 2. Rostherne Mere, 8, 1883, H. Searle sp. This is a variety that is probably the same as Fries named '*C. nutans*,' but afterwards as *C. riparia* var. *obesa* Fr. = var. *deformis* Beml. It has much the habit and look of *C. nutans* Host.

Calamagrostis Epigejos Roth. 3. Hedge near Bolesworth, 9, 1860, A. Croall sp.

Aira uliginosa Weihe. Chester, Miss Potts. Top. Botany.

Festuca uniglumis Soland. The description of the growth (p. 356) is very like that of *F. ambigua* Le Gall, and the date is early for it to turn brown. In St. Helen's Spit, in the Isle of Wight, they both grow together, and have been gathered mixed, and named *uniglumis*, but *uniglumis* is green! in the middle of June, when *ambigua* is quite a rich yellow-brown. In Norfolk *ambigua* can be seen for some distance by this colouring and its gregarious growth.

Nephrodium cristatum Rich. 6. I have a specimen gathered at Wybunbury Bog, 10th September 1847, by Dr. J. Wood, and in 1875 by Dr. Fraser.

FISH OF THE LINCOLNSHIRE WASH AND FENLAND.

THE LATE T. J. H. BROGDEN,
Spalding.

THE following notes have been transcribed and arranged in order from Mr. Brogden's manuscripts; they are a list of such marine and freshwater fish as have come under his notice in the 18th Division (Spalding and Holbeach) of the Natural History Map of Lincolnshire (the Rev. E. Adrian Woodruffe-Peacock's).

JOHN CORDEAUX.

Galeus canis Bonap. **Common Tope.** Frequently to be found dead on the Holbeach out-marshes, having been left by the tide.

Mustelus vulgaris Müll. & Henle. **Smooth Hound.** The same remark applies.

Acanthias vulgaris Risso. **Picked Dogfish.** The only specimen I have caught is now in the Leicester Museum, but I believe it is frequently taken in the nets set for flounders.

Raja clavata L. **Thornback Ray.** Frequently taken in the shrimp and flounder nets.

Raja batis L. **Common or Blue Skate.** Frequently taken in the shrimp nets at the Welland mouth.

Acipenser sturio L. **Sturgeon.** Frequently ascends the Welland. One was taken exactly in front of my gate a few years ago by a blow from a boathook. The same man who took it caught one in the same year at the mouth of the river, weighing eighteen stone. They have also been taken in the New river in Cowbit Wash and in Vernatt's drain.

Perca fluviatilis L. **Perch.** Unfortunately, although very slightly decreasing in number is certainly doing so in size. The largest on record taken in our Spalding Club waters was 4¼ lbs. My own record for weight in one day is four fish, weighing collectively 9 lbs. 6 oz.

Acerina cernua (L.). **Pope** or **Ruffe.** To be found in the Spalding Fishing Club waters, but not common.

Mullus barbatus L. **Red Mullet.** Very occasionally ascends the Welland.

Lampris luna (Gm.). **Opah. King-fish.** I have only seen one specimen of this fish, caught about 1879, and weighing 63 lbs. I believe it has also been taken at the lower part of the Welland brushwork.

December 1899.

Scomber scomber L. **Mackerel.** Only caught when driven out of its course by storms.

Trachinus draco L. **Great Weever.** Occasionally met with at the mouth of the Welland.

Lophius piscatorius L. **Angler.** Odd specimens taken after rough weather in the estuary of the Wash. Last seen personally in September 1892, at Fossdyke.

Cottus gobio L. **River Bullhead.** The Miller's Thumb is not uncommon in both the Welland and Glen, especially after a long drought.

Cottus scorpius L. **Short-spined Sea Bullhead.** Plentiful in the Wash.

Trigla cuculus L. **Red Gurnard.**

Trigla gurnardus L. **Grey Gurnard.**

Trigla pæciloptera Cuvier. **Little Gurnard.**

The Red and Little very rare; have only seen one specimen of the former (caught by myself) and two of the latter, taken at Fossdyke. The Grey is very common.

Agonus cataphractus (L.). **Pogge** or **Armed Bullhead.** One of the commonest fishes in the Wash. Has a nasty habit when taken by the tail of striking round and inflicting a painful wound with its armoured head.

Cyclopterus lumpus L. **Lumpsucker.** Very common during the spring months.

Anarrhichas lupus L. **Wolf-fish.** Frequently taken by the trawlers. I sent a fine specimen a few years ago to the Leicester Museum (1894), which I saw killed with a boat sprit at the mouth of the Welland. When struck it bit nearly through the shaft of the sprit.

Blennius pholis L. **Shanny.** Very plentiful in the Wash, and taken in great numbers by the shrimpers. Shrimps appear to be its favourite food.

Centronotus gunnellus L. **Butterfish.** Very plentiful in the Wash in the warm months (May to September). Is more slippery than any eel.

Zoarces viviparus L. **Viviparous Blenny.** Very common in summer in the Wash. Twenty to thirty may often be taken in one lift of the shrimp trawl.

Atherina presbyter Cuv. **Atherine. Sand-Smelt.** Of annual occurrence; occasionally caught in shrimp trawls in the Wash.

Mugil capito Cuv. **Grey Mullet.** As a rule very common in the early autumn in the lower reaches of the Welland.

Gastrosteus aculeatus L. **Three-spined Stickleback.** Not at all as plentiful as might be expected, considering the number of ditches in the district.

Gastrosteus pungitius L. **Ten-spined Stickleback.** Frequently found in the drains and ponds in the neighbourhood, but not so plentiful as the former.

Gadus morrhua L. **Common Cod.** Codlings are destroyed in immense quantities by the shrimp trawlers in the Wash. The pressure of the water in the net no doubt kills the majority before trawling in.

Gadus æglefinus L. **Haddock.** Small Haddocks are killed in large quantities by the shrimp trawler.

Gadus merlangus L. **Whiting.** Small ones are taken in large quantities at times in the shrimp trawls at the mouth of the Welland.

Gadus virens L. **Coal-fish.** Occasionally found stranded on the sandbanks at the mouth of the Welland.

Merluccius vulgaris Flem. **Hake.** Occasionally washed on shore after a heavy storm.

Molva vulgaris Flem. **Ling.** Only taken after heavy storms by which it has been stranded on the sandbanks.

Ammodytes lanceolatus Lesauv. **Greater Sand-Launce.** Plentiful in the Wash and the mouth of the Welland.

Ammodytes tobianus L. **Lesser Sand-Launce.** Occasionally taken in the shrimp trawls in the Wash.

Fam. PLEURONECTIDÆ. – **Brill, Dabs, Flounders, Fluke, Halibut, Plaice, Soles,** and **Turbots** are all found in more or less quantities according to season, but with the exception of the Common Sole (*Solea vulgaris*) are usually small. I have taken the Common Sole in the Wash up to 3½ lbs. the pair.

Cyprinus carpio L. **Common Carp.** Only an introduction into the district, and not at all plentiful anywhere.

Cyprinus cæruleus Jenyns. **Azurine.** Believed to have been taken in the Glen river by more than one angler.

Cyprinus auratus (L.). **Gold-carp.** Imported into local ponds.

Cyprinus fluviatilis (Flem.). **Gudgeon.** Common in Welland and Glen, in which latter river it attains an unusual size.

Leuciscus rutilus (L.). **Roach.** Very plentiful; the largest specimen from Spalding Club waters, 2 lbs. 10 ozs. (preserved).

Leuciscus cephalus (L.). **Chub.** To be found in the upper reaches of the Welland and Glen, but not plentiful; has also been taken in the Vernatt's drain.

Leuciscus vulgaris Flem. **Dace.** Common in the rivers and drains of the district and attaining large dimensions.

Leuciscus erythrophthalmus (L.). **Rudd.** Plentiful in all the large drains; also in the Welland and Glen. A stuffed specimen, belonging to the Spalding Fishing Club, supposed to be a cross between a Roach and a Rudd, was taken in 1896 in the Vernatt's, and weighed 2 lbs. 10 ozs. some time after being caught.

Leuciscus phoxinus (L.). **Minnow.** Only to be found in the Glen and the upper portion of the Welland.

Tinca vulgaris Cuv. **Tench.** Common in all the drains and in many ponds. Runs up to 5 lbs. in weight.

Abramis brama (L.). **Bream.** Has in the last few years become plentiful in the river Glen. I sent a specimen I caught in the Glen at Surfleet, weighing 5¼ lbs., to the South Kensington Museum.

Alburnus lucidus Heck. & Kner. **Bleak.** To be found in sparse numbers in the upper parts of Welland and Glen.

Cobitis tænia L. **Spinous Loach.** Have only caught one example and in river Glen.

Belone vulgaris Flem. **Gar-fish.** Occasionally taken in the 'Butt' nets.

Esox lucius L. **Pike.** Very plentiful; the record fish for the Spalding Fishing Club waters is 22 lbs.; 12 lbs. to 16 lbs. used frequently to be taken, but now (probably to over-stocking) a 12 lbs. fish is considered very good.

Salmo salar L. **Salmon.** Taken in odd numbers almost annually in the Flounder nets at the mouth of the Welland.

Salmo trutta Flem. **Sea-Trout.** Frequently taken in the Flounder nets in the Welland.

Salmo fario L. **Common Trout.** Occasionally taken in the Welland, Glen, and Vernatt's. The specimen belonging to the Spalding Fishing Club measured 29 inches; it was caught in the Glen, but was in bad condition, having lost the sight of one eye and many teeth.

Osmerus eperlanus (L.). **Smelt.** Taken in large quantities. Three years since I assisted in drawing a net through a deep hole in the Welland, when in one haul we caught 751.

Clupea harengus L. **Herring.** Very plentiful in certain seasons.

Clupea sprattus L. **Sprat.** Frequently taken in tons at the mouth of the Welland; also often left on shore in great quantities.

Clupea alosa L. **Allis Shad.** Occasionally taken at the mouth of the Welland.

Clupea pilchardus Walb. **Pilchard.** Have only seen three specimens, taken in the 'Butt' nets at Fossdyke, 1895.

Anguilla vulgaris Flem. **Sharp-nosed Eel.**

Anguilla latirostris Risso. **Broad-nosed Eel.**

Anguilla mediorostris Yarrell. **Snig Eel.**

All plentiful, but the broad-nosed undoubtedly attains the greatest weight—locally called 'Browits.' There is also an Eel which attains a great size, but weighs very lightly, locally called 'Frog-mouthed Eel.' One day in August of 1897 I caught five, weighing 11¾ lbs., in the Spalding Club waters, when out with the keeper.

Conger vulgaris Cuv. **Conger.** A few are annually taken. The largest I have caught was 6 ft. 6 in. long and weighed 38½ lbs. This was in 1894 at Holbeach Marsh.

Syngnathus acus L. **Great Pipe-fish.**

Nerophis lumbriciformis (L.). **Lesser Pipe-fish.**

Syngnathus ophidion Conch. **Snake Pipe-fish.**

The former of these is undoubtedly the most uncommon of the three, and owing to chances of observation I am not certain the second has not been overlooked.

Petromyzon marinus L. **Sea-lamprey.** Fairly plentiful; my specimen I caught at Surfleet in 1884 measures 2 ft. 9 in.

Petromyzon fluviatilis L. **Lampern** or **River Lamprey.** To be found both in the Welland and Glen.

NOTE—ORNITHOLOGY.

Little Auk at Wetwang-on-the-Wolds.—A Little Auk (*Mergulus alle*) has just been picked up here in an exhausted condition. We have had several heavy gales, but all from the west, none from the east, so I do not see how the poor wanderer could have found its way here except from the west coast. Anyhow the fact is worth recording.—E. Maple Cole, Wetwang, 14th November 1899.

NOTE—MOSSES.

***Gymnostomum fragile* Ibbotson.**—By the kindness of the family of my late friend Mr. Sylvanus Thompson, of York and Settle, I have become possessed of his collection of mosses. In this I have found one sheet bearing several tufts (not fruiting), with a general label to them in Henry Ibbotson's own characteristic writing, though not signed by him, as follows:—'*Gymnost. fragile* Ibb. MSS. Bolton Woods, 1842.' This suggests an inquiry whether any other specimens of the supposed species were distributed, whether Ibbotson described and named any other mosses as new, whether his descriptions and names were ever published and where, and if his manuscripts are in existence.

Forgetting the man's later faults, of which the hurt and disgrace were to himself alone, Ibbotson's name should still be honoured by Yorkshire botanists. But it must be added that if no moss-species have been published in his name, it is probably better so. Dr. Braithwaite has favoured me by examining the specimens in the present case, and he finds them to be *Barbula curvirostris* Lindb. Even as such, however, the locality is worth recording. In Mr. F. Arnold Lees' 'Flora of West Yorkshire' this species is described (under *Gymnostomum*) as very rare, and only one station, Arncliffe, is given for Wharfedale.—WILLIAM WHITWELL, Balham, London, S.W., 8th November 1899.

NOTES—FLOWERING PLANTS.

***Galeopsis versicolor* in mass near Stickney.**—Some years ago, in a peaty field near Stickney, I saw an abundance of this beautiful plant (*Galeopsis versicolor* Curt.) in full flower, and well remember the pleasure which the sight gave to me. Judging from the height and branching of the individual plants, they were similar to those seen by Mr. Burton on the bank of the Trent. It is always more luxuriant in potato or turnip fields than in cornfields, so far as my experience goes, but I never before or since saw it in such quantity as in the field above-mentioned. It is thus described by Ray:—'Lamium cannabino folio, flore amplo luteo, labio purpureo.'—W. FOWLER, Liversedge Vicarage, 16th November 1899.

***Galeopsis versicolor* in mass.**—Apropos of Mr. Burton's interesting note in the November 'Naturalist' (ante, page 330), I may record that in my experience *Galeopsis versicolor* Curt. has been what *Colias edusa* and *Macroglossa stellatarum* are to the lepidopterist, a species of singularly irregular occurrence. I remember a field above Valle Crucis Abbey, near Llangollen, being pointed out to me in 1863 as a locality for it, but it was considered a rare plant, and I did not meet with it anywhere else in a wide district of which my then residence, Oswestry, in Salop, was the centre. But in 1865 it sprang up everywhere in profusion in cultivated fields and on road-side rubbish heaps, in tens of thousands. The plants ran usually about two feet high—or that might be their average—and the flowers were magnificent in size and colouring. During 1866 the species was still abundant, though less so than in 1865. In the following years it returned to its original scarcity; indeed, I do not recollect seeing it again while I remained in Oswestry, which was till the summer of 1869. But in 1875, during a visit, I again found it in plenty in the neighbourhood of Trevor Hall, near Ruabon, and have no record or memory of then seeing it elsewhere.

During my residence at York, 1877-1882, I was familiar with a considerable circuit of country round that city, but met with *G. versicolor* once only. That was in October 1878, in an apparently neglected beanfield near Riccall, which contained several hundreds of plants still in flower, but with blossoms less finely developed than those at Oswestry in 1865. During the twenty-one years which have since elapsed, I have not again observed the species, or at any rate fail to remember having done so.—WILLIAM WHITWELL, Balham, London, S.W., 8th November 1899.

EXTRACTS FROM A CONCHOLOGIST'S NOTEBOOK.

WILLIAM NELSON, Hon.M.C.S.,
Crossgates, Leeds; Ex-President of Leeds Conchological Club.

5.—TO WHINMOOR IN SEARCH OF *LIMNÆA GLABRA.*

At the latter end of April 1899 I started after dinner with my friend Mr. G. Walker, of Stanks; we went along the old grass-grown lane leading to Whinmoor, and after proceeding along this most rugged of roads for some little distance, we turned along a footpath to the right across some fields. As we went slowly along we disturbed a weasel, which crossed an angle of the field and disappeared in a dry dyke by the hedge-side. We then reached the historic Cock Beck, which we crossed by a small wooden bridge; here we stopped some time, and, examining some small stones where the beck runs swiftly, found a number of *Ancylus fluviatilis.*

Leaving here we entered an old lane, each side of which is lined by honey-suckle plants and rose-bushes, both of which were putting forth their foliage for the coming season; the wayside was further enlivened and beautified by a number of bushes of gorse with their golden-coloured flowers. Having arrived close to the railway bridge, we looked around for some signs of a pond, and at the far side of the field towards Morwick Hall we saw indications of one; my companion being the most agile crossed to examine and signalled me to follow. We found the pond a rather small one; evidently it had been dug for cattle, for though full of water there seemed to be no apparent source from which it was supplied. The shallow end had a quantity of long grass growing in it which lay along the surface and at the deeper end, water-cress and other aquatic plants. The first dip of the net fished up a number of *Planorbis contortus*, the next brought in addition *Limnæa peregra* and one specimen of *Limnæa glabra*; this at once whetted my appetite for more, but after a most diligent search only three examples were secured. The deeper end of the pond produced *Planorbis umbilicatus* and *Limnæa peregra*; here *Planorbis contortus* was almost absent, being nearly confined to the grassy shallow end. The association of species here is in my experience unique, *Physa hypnorum* and *Planorbis spirorbis* being both absent.

The clouds had been for some time gathering in a threatening manner, so we deemed it best to return to the lane again, where we secured our first flowers of *Anemone nemorosa.* My com-

panion seemed to have an innate faculty for finding bird's nests, and was continually pointing them out to me, and before leaving me in the old lane leading from the Barwick road to Manston he pointed out to me a robin's nest built beside this busy road; standing a few yards away we watched the parent bird sitting on its eggs, and left hoping that no marauding youngster would discover its snug home.

NOTES—MOLLUSCA.

***Planorbis corneus* at Skipton.**—When in Skipton on Tuesday, 14th March 1899, my friend, Mr. J. J. Wilkinson, and myself went down the Skipton Beck, which has been straightened by the local authorities to prevent the flooding of the lands which adjoin it, to study the lateral corrosion of its banks by the water. Amongst other peculiarities, we noticed a high and wide line of flood débris, amongst which we found a great number of *Planorbis corneus* L., in various stages of growth, containing the contracted bodies of the animals. Many of the shells were broken, as if by birds in search of the contained animals, and we noticed several jackdaws in the fields through which the beck runs.

We suspected that these molluscs had been washed out of some still water by a flood which happened some ten days previous to our visit. The record, even as it stands, is of interest.—HENRY CROWTHER, The Museum, Leeds, 11th April 1899.

[It would be of great interest if Mr. Wilkinson, or some local naturalist, would ascertain the source whence the shells in this flood-refuse were derived, i.e., whereabout near Skipton the species occur, and whether the species is a true native of the district.—ED. NAT.]

With the Yorkshire Naturalists' Union at Stutton Carrs. On the 10th of June 1899 I arrived at Stutton Station, and taking the road to the right just touching the end of the village, I was soon beside the old mill, and found that I was very fortunate in the dry weather, two previous visits to this locality having jointly yielded three small examples of *Limnæa peregra* only.

On the present occasion, crossing the osier-beds which are here cut down, I was enabled to reach the water that supplied the mill, and was at once gladdened by the sight of very fine examples of *Limnæa peregra*. I did not search long before *L. auricularia* appeared amongst them. They were rather small, but characteristic specimens. Numerous *L. palustris* were lying scattered about on the drying but yet rather soft mud. Continuing my search along the almost dry bed of the water-course, and sweeping the net amongst the Equiseta where it was possible to do so. I obtained *Planorbis albus* very sparingly, and *Physa fontinalis* rather more commonly. In the oozy mud at the bottom myriads of *Valvata piscinalis* of various sizes have their home; here also I obtained examples of *Pisidium fontinale*.

Turning back again and getting to the other side of the mill I found *Bythinia tentaculata*. Searching the margin of the Cock Beck at this point yielded nothing, which is soon fully explained when a few ducks came gliding along the water.

Having now spent from two to three hours here in the hot sunshine I was glad to seek shelter under the dense foliage of a horse chestnut tree, which by-the-by was in full bloom, here while in the cool shade I sat and watched the erratic flight of the white butterflies intermixed with the more steady flight of the beautifully-coloured male Orange-tip. When cleaning the shells on arrival at home I was pleased to find attached to the shell of *L. auricularia* a single example of *Ancylus lacustris*. —WM. NELSON, Crossgates, 12th June 1899.

THE SOURCE OF THE LINCOLNSHIRE COAST BOULDERS.

ALFRED HARKER, M.A., F.G.S.,

St. John's College, Cambridge.

It appears from Mr. Burton's communication in the November number of 'The Naturalist' that he and Mr. Wheeler still reject the idea that boulders have been transported coastwise across the Humber mouth. As I think they have not quite appreciated the cogency of the argument, I will venture to re-state it more pointedly.

It is admitted that the Holderness coast is, and always has been, rapidly wasting. Mr. Wheeler thinks that I have exaggerated the amount of this waste, but it is easy to make a rough calculation from approximate data. Taking the average loss at one yard, the average height of the cliffs at ten feet, and the length of coast-line from Bridlington to Kilnsea at thirty-five miles—all well within the mark—I find the amount of boulder-clay removed in a century to be more than two millions of tons. If we further suppose 10,000 years to have elapsed since the Glacial Period, and estimate the boulders at one-twentieth of the whole mass, we have ten millions of tons of boulders to account for.

While the fine material is rapidly washed away, the boulders travel slowly southward along the coast. They can be traced as far as Spurn Point, where, under existing conditions, they accumulate. The headland is composed essentially of material thus collected, and is steadily extending southward. On this point there is no need to call Camden into court, for we have at least four official surveys from 1684 onward, and these prove an extension of more than a mile-and-a-half in two hundred years.

Now it is manifest that this process cannot go on for long in the future, and cannot have gone on for long in the past. Spurn Point must be only a temporary resting-place for the boulders: what then becomes of them ultimately? Mr. Wheeler suggests that 'many of them, in being rolled about, get ground to sand'; but, if this occurs to any extent, it must be while the boulders are on their journey to Spurn, not after they have reached that resting-place, and so it cannot help to solve the problem. Mr. Reid's explanation, which I quoted in my former note, seems to be the only possible deduction from the facts.

December 1899.

Further, the cycle of events as pictured by Mr. Reid, explains not only where the Yorkshire coast boulders go to, but also where those on the Lincolnshire coast come from; and in rejecting it, Mr. Burton is bound to furnish alternative answers to both questions. To show that similar boulders occur embedded in the boulder-clays of Lincolnshire is not enough. It must also be shown that such clays are found in places where they are exposed to marine erosion. The distribution of the boulders along the Lincolnshire coast is also a point of importance, and here the large shingle beach of Donna Nook is a crucial test. The stones there cannot have come from the warp-covered shore of the Humber, and any accumulation of boulders derived from the Lincolnshire coast itself must be sought southward, not in the extreme north.

There is one more significant point which has been overlooked. The Lincolnshire coast boulders, according to Mr. Burton, are mostly of small size: of the twenty specimens which he has described, none measured more than five inches. This accords with the supposition that they have travelled far. The boulders embedded in the Lincolnshire boulder-clay, as described by Mr. Wheeler, include some of large dimensions: he records one six feet in length, besides ammonites more than a foot in diameter. A collection of boulders on the shore, if derived from an immediately local source, ought to have a fair proportion, and indeed more than a fair proportion, of the large ones. This is the case on the Yorkshire coast; but, so far as our information goes, it does not seem to be the case in Lincolnshire.

NOTE—HYDROZOA.

Early Notices of Yorkshire Hydrozoa.—I do not know how many references there are in 'The Naturalist' to Scarborough Hydrozoa, and the following may have already been entered as old records for that place. The modern name is given first:—

Sertularia filicula E.&S. 'It is commonly found on the coast of Scarborough, in Yorkshire.' Ellis & Solander, Nat. Hist. of . . . Zoophytes. 1786, p. 57. Same name, Hincks' H. Z., 265, 'Common . . . Scarborough, Filey, etc.'

Sertularia cupressina L. 'The 'Sea-Cypress' [Ellis's name] is chiefly found in deep water on the coast of Yorkshire . . . ' etc., Ellis & Solander, p. 39. Hincks, p. 272, says, 'Common on Yorkshire coast.'

Thuiaria thuja L. 'They are found on the coast of Scotland and in the North of England, particularly about Scarborough, where the fishermen have given them the name of Bottle-brushes,' Ellis, Corallines, 1755, p. 11. 'A prevalent northern form,' Hincks' H. Z., 276.

Plumularia frutescens E.&S. 'This Coralline was found at Scarborough,' Ellis & Solander, 1786, p. 55, as *Sertularia f.* Hincks' H. Z., 308, says. 'Rare on Yorkshire Coast, Mr. Bean has dredged it at Scarborough.'—S. L. Petty, Ulverston, 3rd November 1899.

FUNGUS FORAY AT SUTTON, NEAR ASKERN,
25TH, 26TH, AND 27TH SEPTEMBER 1899.

CHARLES CROSSLAND, F.L.S.,
Halifax; Hon. Sec. Yorkshire Mycological Committee.

THE Annual Fungus Foray was held at Sutton, near Askern. The selection of the district, under the advice of Mr. W. Denison Roebuck, F.L.S., was a most happy one. To further ensure the success of the meeting, Mr. Roebuck recommended that the headquarters be at Sutton village, situated in the heart of the district to be worked, and by arrangement the house of Miss Sorby was placed at the disposal of the Mycological Committee and friends. The committee turned up in good force. The gathering included Messrs. G. Massee, F.L.S., of the Herbarium, Royal Gardens, Kew; Harold Wager, F.L.S., Leeds; U. Bairstow, Halifax; W. N. Cheeseman, Selby; A. Clarke, Huddersfield; Thos. Gibbs, Sheffield; Thos. Hey, Derby; James Needham, Hebden Bridge; J. Wms. Sutcliffe, Halifax, and C. Crossland, F.L.S., Halifax, Secretary. Letters expressing regret at their inability to be present were received from the Rev. W. Fowler, M.A., Liversedge; Mr. Thos. Birks, Yarm-on-Tees, and Mr. M. B. Slater, J.P., Malton.

Permission was obtained from Mr. F. Bacon Frank, Campsall; Mr. C. E. Charlesworth, Owston; Mr. G. B. C. Yarborough, Camps Mount; Mr. P. S. Neville, Shelbrook, and other landowners, to visit their woods and parks.

Mr. A. Clarke and the writer spent the previous week-end in surveying the district in preparation for the general foray, so that the work should be carried on with as little loss of time as possible.

With all these excellent woods, parks, and pastures to explore, and all close at hand, this would have been one of the choicest districts ever visited by this section of the Union, had not the preceding dry season kept back its undoubtedly rich fungus flora. In many places, both in woods and bare pastures, the ground was parched and cracked; crevices one to two inches wide were common. In the drier parts of woods the dead leaves and twigs crackled under one's feet with a disappointing crispness. The light rains of the previous week had improved matters a little in the moister places.

Five of the members, including Mr. Massee, arrived on the scene on the 23rd, the remainder on the 25th. Monday's proceedings commenced, after the arrival of the 10.12 train at

Askern, by the investigation of Campsall woods. The game-keeper's son acted as guide and pointed out a few special places where three, at any rate, of the chief combinations favouring the growth of fungi prevailed, viz., plenty of fallen trunks and branches, ground moisture, and shade. Here a few choice things were picked up, including one of the earth-stars, *Geaster michelianus* W. G. Sm.; this occurred in quantity, specimens in all stages of development being collected. There were also micro-species in abundance about, and a few Agarics. Parks and pastures, however, were found to be almost destitute of fungi; even the ubiquitous *Stropharia semiglobata* Batsch was somewhat scarce. Species of *Hygrophorus*, *Leptonia*, *Entoloma*, and pasture-land lovers of several other genera were conspicuous by their absence. Not a single *Hygrophorus* was collected. The moist places in the woods had to be relied upon, as was the case last year at Harewood and East Keswick.

Mr. Clarke was fortunate in picking up in a wood near Sutton a peculiar Hyphomycete resembling a large *Stilbum*; the genus (*Symphosira*) to which it belongs is new to Britain, and the species new to science. There was plenty of it, and good specimens were gathered; its life-history is in process of being worked out, and will be duly reported upon at some future time.

The woods were not so well stocked with Agarics as one could have wished, but a few choice places were come across which yielded very well. The bright-looking Lactarius, *L. volemus* Fr., was met with abundantly in one part of Owston. These woods were visited on Tuesday. Quite a number of interesting species were discovered in an old quarry; here *Helotium fagineum* (Pers.) on beech-mast was much in evidence. *Xylaria carpophila* Fr., strange to most of the party, was also found plentifully on the same matrix. In one place *Clavaria cinerea*, in the best of condition, was so plentiful that one could scarcely put a foot down without crushing a tuft. This being a delicious edible species advantage was taken of its abundance, and a good dish gathered. It was nicely prepared by the hostess, and fully came up to expectation. *Vectria affinis*, a new Yorkshire species, was found at Sutton.

The unsightly Sycamore Leaf-Blotch, *Rhytisma acerinum* (Pers.), was exceedingly common in many places. Young Sycamores were noticed having their leaves so covered with big black blotches that the trees appeared at a distance as if they naturally bore black leaves. This fungus does not mature on the fallen leaves until the following spring, thus there is ample opportunity in the meantime to collect and burn diseased leaves.

and so arrest its recurrence. The rarer *Rhytisma punctatum* was also present on sycamore leaves.

A field of clover near Campsall was noticed to be badly infected with the Clover Leaf-Spot, *Pseudo-peziza trifolii* Fckl. Most of the leaves were more or less scabbed with this fungal parasite. The disease greatly reduces the quality of this valuable forage plant. Both these plant scourges are referred to in Massee's recent 'Text Book of Plant Diseases' (Duckworth and Co.). This most valuable, practical book ought to be in the hands of every forester, farmer, and gardener in the country. It deals with the various plant diseases in language free from unnecessary technicalities, and, in most cases, figures are given of the parasite. In all cases methods of prevention are added.

On Wednesday a portion of Burghwallis woods was looked through with fairly satisfactory results. On the same day a second visit was paid to a good corner of Owston Woods, when *Helvella ephippium* Lév. and a few others were added to the list. In all 238 species were collected.

On the Monday evening Mr. Massee gave a paper on 'The Modern Tendency of Mycological Study,' which has already been printed in 'The Naturalist' (November 1899, pp. 337-339).

On the Tuesday evening Mr. Wager spoke on 'Fertilisation in the Fungi,' in which he pointed out that in the Alga-like fungi such as *Peronospora* and *Cystopus* there is a very distinct sexual differentiation of male and female organs, and the phenomena of fertilisation are in every way comparable in their essential characteristics to those which occur in the higher plants. In some of the simpler forms of fungi there is a much less complete sexual differentiation; and in the higher forms, such as the Hymenomycetes, Ascomycetes, etc., there is what may be termed a pseudo-fertilisation, which replaces physiologically the true sexual process, and may have been derived from it. The study of fertilisation processes in the fungi offers a wide field of research for the investigation of the problems connected with sexual processes. Mr. Clarke exhibited a fine series of stereoscopic photographs of fungi, some of which he has prepared from photographs taken at previous Y.N.U. Fungus Forays. The Secretary had a collection of water-colour drawings, accompanied by descriptions and notes of micro-fungi.

On the Wednesday evening the committee was nominated for re-election for the ensuing year, with Mr. Massee as President and Mr. C. Crossland as Secretary. It was decided to recommend Mulgrave Woods, near Whitby, as the place for next year's meeting. Thanks to the local landowners concluded a very pleasant and successful meeting.

In the following list of species collected the Hymenomycetes are arranged according to Fries' system, but the names are as in Massee's British Fungus Flora.

In all cases the initial B. indicates Burghwallis; C. Campsall; O. Owston; S. Sutton.

BASIDIOMYCETES.

HYMENOMYCETES.

AGARICACEACEÆ.

Lepiota rachodes Vitt. O. & C.
Lepiota acutesquamosa Wein. C.
Lepiota cristata Alb.&Schw. C.
Armillaria mellea Flo.Dan. O.
Tricholoma rutilans Schæff. S.
Tricholoma carnea Bull. S.
Clitocybe hirneola Fr. O.
Clitocybe odora Bull. S.
Laccaria laccata Fr. O.
Collybia radicata Bull. C.
Collybia fœdens Kalch. S.
Collybia velutipes Curt. O. & B.
Collybia confluens Pers. C.
Collybia conigena Pers. S.
Collybia cirrhata Schum. S.
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HENRY THOMAS SOPPITT.

Henry Thomas Soppitt.

Born June 21st, 1858. Died April 1st, 1899.

BY the death of H. T. Soppitt which took place on April 1st, at his residence, 12, Glen View, Halifax, botanical science loses one of its most devoted adherents. He succumbed, after a short illness of about a fortnight, through complete nervous prostration, the result of an acute attack of pneumonia.

He was born at Bradford, June 21st, 1858. His father, by trade a grocer, was a much respected man, well-known as a temperance advocate and a philanthropic visitor to prisoners at the Bradford Town Hall. Mr. Soppitt was brought up in his father's business. In his early manhood he began to show a strong liking for natural history. Soon after the formation of the Bradford Naturalists' Society in August, 1875, Mr. Soppitt became one of its members and so remained until his death. In 1885 he was vice-president, and in 1886, president.

His attention was at first given to butterflies and moths, and being possessed of untiring energy and perseverance he soon got together a good collection of local species. Finding his study of Entomology required some knowledge of plant life he joined a botany class at the Church Institute under Mr. C. Pocklington. Mr. J. W. Carter of Bradford, an old

naturalist friend of his says :—"After successfully going through a course of elementary botany he joined, with other members of the Naturalist Society, in real practical field-work, to him the most enjoyable part of natural history."

Mr. Soppitt, along with Mr. W. West, F.L.S., Mr. Carter, and others, investigated and catalogued in a very short time the flowering plants of the Bradford district so completely that comparatively few additions have since been made. Mr. Carter continues—

"At this time Mr. Soppitt and Mr. West had often long walks before breakfast in search of nature's treasures. For a few years he worked indefatigably at our British flowering plants, walking long distances in the search thereof, until the majority of our native species were as familiar to him as the common daisy is to an ordinary observer. He did not stop here. 'Onward' was his motto, and, after making an acquaintance with the Phanerogams, he commenced the study of fungi, both large and small, through the instrumentality of Mr West, who strongly urged him to take up this neglected branch of science. Here was a wide field open for original research, and one which Mr. Soppitt at once took advantage of, with results which are known to Mycologists throughout the world."

As one instance of the thoroughness of his method of working, we may here state that he devoted one whole season, scarcely including anything else, to the tedious study of grasses and sedges.

Being so ardent a lover of nature all her works were full of interest for him ; birds, insects, flowers, ferns, moths, or fungi were equally his delight. He knew the birds as intimately as one knows his closest friends. The notes of each one were familiar to him. He would stand and listen with rapture to their songs and calls. He often went many miles on purpose to hear the songs of the Nightingale and the Grass-hopper Warbler and would talk with ecstasy of their charming notes. For fifteen years he contributed weekly, often jointly with Mr. Carter, to the Naturalists' Column of the *Bradford Weekly Telegraph*. Among the joint articles were "Rural Walks Round Bradford," "The Flora of the Bradford District" being a list of 550 species of flowering plants and ferns found within a radius of six miles round Bradford ; "A List of the Mammalia of the Bradford District," "Our Local Reptiles," etc. Mr. Soppitt and Mr. Carter prepared a list of "Land and Freshwater Mollusca of Upper Airedale," which appeared in the *Naturalist* for March and April, 1888. Ninety-three species were enumerated. Not more than two species have been added since its publication. This list also appeared

in pamphlet form. Anxious to encourage others in the study of nature, he in 1886 conducted a series of free botanical classes at Saltaire. At the close of the series he was presented by the students with a valuable collection of books in recognition of his services.

Ten or twelve years ago he turned his attention more especially to working out the life histories of those troublesome fungal parasites known as Uredines, which prey so disastrously upon many of our flowering plants, both wild and economic. Most of this class of fungi have two or three stages in their complete life-cycles. Sometimes all the stages are developed on the same host-plant, whilst in other cases the fungus requires a couple of hosts for its full development and often the two hosts are plants of totally different characters. The respective stages were formerly considered to be distinct species of fungi having no direct relationship with each other. Again, two species of fungi may affect one plant, even grow on the same leaf, thus making their investigation more complicated. His wide knowledge of flowering plants helped him materially in his biological studies of these fungi. His experimental researches have made known the life-histories of several species 'which had previously been shrouded in mystery or wrongly interpreted.' Dr. Plowright, of King's Lynn, one of our best British authorities on this class of fungi says: "Prior to his work the *Æcidium* and *Puccinia* on *Adoxa Moschatellina* were regarded as being of the same species, but he demonstrated that . . . they had no relation." He next cleared up the life history of *Æcidium leucospermum* which occurs on the wood-anemone, *Anemone nemorosa*, showing it by careful experimental cultures, to be an *Endophyllum* "and that the fungus had nothing whatever to do with the *Puccinia fusca* which occurs on the same host-plant." Dr. Plowright further says: "He attacked that complicated problem, the life-history of the *Puccinia* on *Phalaris arundinacea*, proving that the *Æcidium* on Lily-of-the-Valley belonged to one of them, which he named *P. digraphidis*, thereby opening a discussion amongst continental botanists as to the relative value of these specific forms, which has hardly yet been concluded. His communications to the *Gardeners' Chronicle* were mostly upon plant diseases, the last being an account of his repetition and confirmation of Klebahn's (a Hamburgh botanist) cultures of *P. Pringsheimiana* on the garden gooseberry" and *Carex vulgaris*. The *Æcidium* was procured from the wild gooseberry

at Windermere, with which material Mr. Soppitt produced the *Puccinia* by infection on *Carex vulgaris* growing in his own garden at Halifax. He contributed occasionally to the *Journal of Botany*, and a paper on "Bermerkungen über *Puccinia digraphidis* Sopp." in *Zeitschrift für Pflanzenkrankheiten*, 1897, vol. viii, p. 8. Mr. Soppitt was the first to demonstrate the connection of an *Æcidium* on the earthnut, *Conopodium denudatum*, with a *Puccinia* on sweet dock, *Polygonum Bistorta*. In 1892 while on a visit to Hardcastle Crags with the writer, Mr. Needham of Hebden Bridge told him that he and Mr. H. Pickles had often noticed on their botanical rambles a yellow fungus on earthnut, and that wherever this occurred the surrounding sweet dock plants were soon after affected with a brown one; also, that in places where the earthnut was free from disease the sweet dock remained the same. This information led Mr. Soppitt to undertake a series of experimental cultures, with a view to testing whether any relationship existed between the two. Eventually he succeeded in proving they were but two separate stages in the life history of one fungus. The experiments are detailed in full in *Grevillea*, vol. xxii, no. 102, 1893, and a lucid description of the whole life-history was given under the title of "A Remarkable Parasite," in the *Halifax Naturalist*, vol. ii, pp. 108-113.

Though he paid special attention to the Uredines, no other branch of mycology was neglected. Mr. Soppitt contributed very largely to the list of fungi in *Lee's Flora of West Yorkshire*. His only regret in connection with this, expressed many a time, was its premature appearance and consequent almost out-of-date classification.

He discovered a *Lactarius* at Bolton Wood, new to science, which he named *L. involutus*; this is figured in Cook's *Illustrations*, t. 1194. Mr. Massee of the Royal Herbarium named a genus of Thelephoreæ, *Soppittiella*, and a species of *Dasyscypha*, *D. Soppitii* in his honour. The generic name has been adopted by continental botanists.

Since first coming to Halifax five years ago, he has steadfastly worked with the writer at the cryptogamic flora of the parish, more especially the fungi. In this department many of the rarer discoveries are due to his diligent investigations; many species new to science have been added. By his aid this branch of botany has been more thoroughly worked at Halifax than at any period since the time of Bolton (1761-1795) a pioneer of British Mycology. At intervals during the last

three winters many local mosses, collected by Mr. Needham, about Hebden Bridge, and by Mr. Soppitt in other parts of the parish have been determined, and several old records confirmed. We well remember his eagerness to visit the birth-place and local hunting grounds of that famous Todmorden botanist — that Prince of British artisan moss gatherers—John Nowell. With his strong kindred natural history tastes he appeared as if he could adore the very house where Nowell and his friends, four or five decades ago, used to look over and discuss their moss treasures. He stood long, reverently gazing at Nowell's monument in Todmorden old Church-yard. In 1894 he left Bradford and settled in Halifax, where he was employed in the order department in the wholesale druggist business of Mr. W. C. Hebden. He became a member of the Halifax Scientific Society, and was a much valued contributor to the *Halifax Naturalist*. For many years he had been a member of the Executive of the Yorkshire Naturalist Union. He was an original member of the "British Mycological Society," and was present at the last meeting, held in Dublin, October, 1898. His last paper was in conjunction with myself and appeared in the *Naturalist* for January, 1899. It contained a description of five species of Discomycetes new to Britain and two new to science. All were found in the Halifax district except one of the latter. This, *Saccobolus granulospermus*, Sopp. and Crossl., was discovered at Harewood, near Leeds, during the Yorkshire Fungus Foray held at East Keswick, September, 1898.

He had great powers of observation. He seemed to know exactly where to look for the things he went in search of. He was always a welcome addition to any of the naturalist excursions, and will be missed by naturalists in every part of the country, and especially by those of his native county. His memory will long be cherished by many who had the good fortune to work with him. Our district was dear to him, as here he could, during his leisure hours, roam the fields, woods, and moorlands to his heart's content without any hindrance. One friend says of him, "It was impossible to know Mr. Soppitt and not to respect his simple honest life and his whole-hearted devotion to science."

In the *Naturalist* for May, Mr. A. H. Pawson, of Farnley, with whom, and Mr. Stansfield, of Southport, Mr. Soppitt visited Switzerland, says—

"Mr. Soppitt was a man of a thoroughly human and amiable disposi-

tion, and had that keen sense of humour which is often the inheritance of Yorkshiremen, and which not seldom enables them to ride merrily over many a wave of ill-luck. In truth, to be in the open field with him was to a nature-lover a liberal education. The glorious sun itself did not beam more brightly than did his face as he noted each herb and tree and flower, each bird, beast, and insect, and poured out of his full brain words of wisdom about them all. He was a naturalist alike in head and in heart On the hills, and in the meadows and woods, he was in full sympathy with his surroundings Nothing was strange to him. He had made them all his own by his love of them. . The joys of Nature were his to the full. A few short weeks passed with him in the Alps will ever be green in our remembrance So fitted was he by disposition and culture for such scenes that this foreign mountain-land seemed to belong to him by right rather than to its natural inhabitants "

His remains were interred at Eccleshill, on the 4th of April. A large number of Yorkshire naturalists attended at the Church to pay their last tribute of respect. He leaves a wife and four children to mourn his loss.

C. CROSSLAND.

Hawkesworth
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W. EAGLE CLARKE, F.L.S., M.B.O.U., GEO. T. PORRITT, F.L.S., F.E.S.,
ALFRED HARKER, M.A., F.G.S., W. B. TURNER, F.R.M.S.

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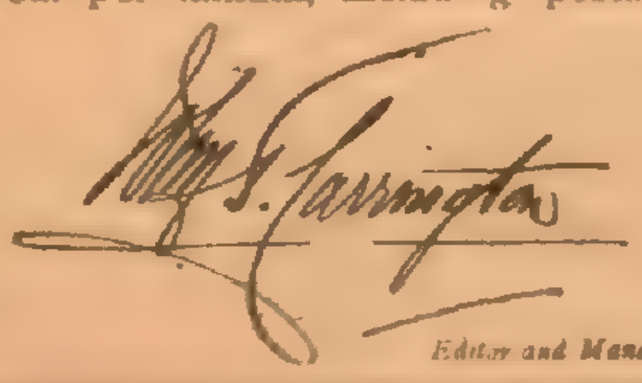

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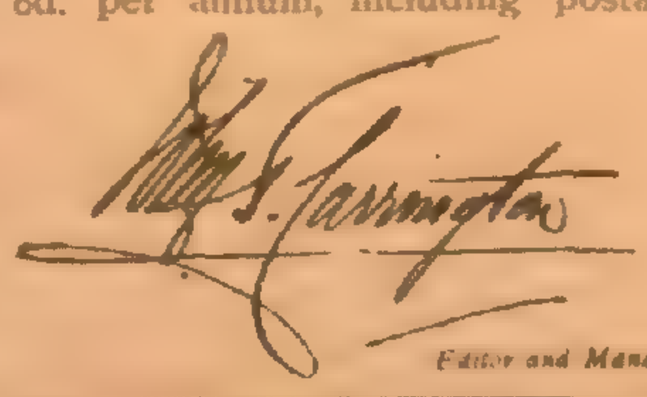

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